

JAPANESE

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CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE  
INVENTION TECHNICAL PROBLEM DESCRIPTION OF DRAWINGS DRAWINGS

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[Translation done.]

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CLAIMS

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[Claim(s)]

[Claim 1] The 1st memory which memorizes the control program of communication link actuation, or one side of voice data and which becomes by rewritable nonvolatile memory electrically, The 2nd memory which memorizes another side of the above-mentioned control program or voice data and which becomes by rewritable nonvolatile memory electrically, The communications control means which controls communication link actuation according to the control program memorized by the 1st or 2nd memory of the above, While making the 2nd or 1st memory of the above memorize voice data, reading this and making it reproduce The sound recording playback control means which makes the 2nd or 1st memory of the above which memorizes the above-mentioned voice data download the new control program obtained through the wireless circuit, The 1st or 2nd memory of the above which was prepared between the above-mentioned communications control means and the 1st and 2nd memory of the above, and between the above-mentioned sound recording playback control means and the 2nd and 1st memory of the above, and has memorized the above-mentioned control program for the above-mentioned communications control means, The change-over connecting means which makes change-over connection of the above-mentioned sound recording playback control means with the 2nd or 1st memory of the above which memorizes the above-mentioned voice data, While making change-over connection with the 2nd or 1st memory of the above which memorized the control program which had memorized the above-mentioned communications control means and newly downloaded voice data for it till then by the above-mentioned change-over connecting means after the above-mentioned download termination The pocket communication terminal machine characterized by providing the change-over control means which makes change-over connection of the above-mentioned sound recording playback control means with the 1st or 2nd memory of the above which had memorized the control program till then.

[Claim 2] The memory which divides area and memorizes the control program and data of communication link actuation and which becomes by rewritable nonvolatile memory electrically, The control means which controls terminal actuation according to the control program memorized by the above-mentioned memory, The download means which the area of the above-mentioned memory which had memorized data till then is made to download when a new control program is obtained through a wireless circuit, While addressing area which newly [ the above-mentioned memory ] downloaded the control data to the above-mentioned control means after the above-mentioned download termination The pocket communication terminal machine characterized by providing an area change means to address so that the area which memorized the control program which was using the above-mentioned memory till then may be made to memorize data.

[Claim 3] The 1st memory group which memorizes the control program of communication link actuation, respectively and which becomes by rewritable nonvolatile memory electrically, The 2nd memory which memorizes voice data and which becomes by rewritable nonvolatile memory electrically, Two or more control means which control communication link actuation according to the control program memorized by one to which it corresponds of the memory groups of the above 1st, respectively, While making the 2nd memory of the above memorize voice data, reading

this and making it reproduce The sound recording playback control means which makes the 2nd memory of the above download the new control program obtained through the wireless circuit is provided. One of two or more above-mentioned control means The pocket communication terminal machine characterized by making one to which it corresponds in the memory group of the above 1st carry out the updating storage of the control program downloaded in the 2nd memory of the above after the above-mentioned download termination.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention has the function which records voice and is reproduced, for example, relates to pocket communication terminal machines, such as a PHS terminal and a specific smallness power transceiver.

[0002]

[Description of the Prior Art] For example, with pocket communication terminal machines, such as a PHS terminal, and a digital cellular phone, a specific smallness power transceiver, the control program required for communication link actuation currently used for the current general target is memorized by semiconductor memory fixed. In this case, it is used as what being used as semiconductor memory does not specifically have the need for nonvolatile memory's power-source backup of both EPROM, a flash ROM EEPROM a mask ROM the ferroelectric RAM, etc., therefore does not consume power vainly.

[0003] However, among the nonvolatile memory which carried out [ above-mentioned ] listing, rewritable things are a flash ROM, EEPROM, and Ferroelectric RAM electrically about the contents of storage, and when [ these ] rewritable nonvolatile memory is used electrically, it is thought possible to update the control program about communication link actuation by transmission and reception of for example, wireless data by version up etc.

[0004]

[Problem(s) to be Solved by the Invention] However, it is the thing which is making rewritable nonvolatile memory memorize a control program electrically. In downloading the control program about communication link actuation by transmission and reception of wireless data and actually updating it by version up etc. In the usual communication link actuation, to the extent that it is unnecessary is [ mass work-piece memory ] needed, it will be very disadvantageous to have such mass work-piece memory beforehand, in order to perform version up etc. in respect of cost, and the price of the pocket communication terminal machine itself will also be influenced.

[0005] Moreover, if a pocket communication terminal machine is carried into a service center, even if nonvolatile memory cannot rewrite electrically, it is possible by exchanging the nonvolatile memory itself or rewriting the contents of storage to also make a control program update.

[0006] Since the time and effort for carrying a terminal into a service center in that case and a considerable period are needed and a terminal cannot be used in the meantime, it becomes impossible updating a control program freely and however, to say.

[0007] By the way, in pocket communication terminal machines, such as a PHS terminal and a digital cellular phone, have a sound recording regenerative function, and digital-data-ize business from the calling party in the condition that it cannot respond to arrival of the mail, it is made to memorize, and there are some which can check business by reproducing the contents of storage at the next arbitration time. Nonvolatile memory, such as a flash ROM, EEPROM, and Ferroelectric RAM, is too used as a storage by this kind of sound recording regenerative function.

[0008] Therefore, in the pocket communication terminal machine which has a sound recording

regenerative function, although nonvolatile memory of the same kind will be used, respectively for two applications, the object for storage of a control program, and the object for digitized voice data storages, these are restricting and using the application mutually in a circuit, and are not used for other applications.

[0009] The place which this invention was made in view of the above actual condition, and is made into the purpose With the pocket communication terminal machine which has a sound recording regenerative function, the nonvolatile memory of the same kind used for two applications, the object for storage of a control program and the object for digitized voice data storages, is utilized effectively. It is in offering the pocket communication terminal machine which can download and update the control program about communication link actuation freely, without needing mass work-piece memory etc.

[0010]

[The technical problem which The means for solving a technical problem invention tends to solve] The 1st memory invention according to claim 1 remembers the control program of communication link actuation, or one side of voice data to be and which becomes by rewritable nonvolatile memory electrically, The 2nd memory which memorizes another side of the above-mentioned control program or voice data and which becomes by rewritable nonvolatile memory electrically, The communications control means which controls communication link actuation according to the control program memorized by the 1st or 2nd memory of the above, While making the 2nd or 1st memory of the above memorize voice data, reading this and making it reproduce The sound recording playback control means which makes the 2nd or 1st memory of the above which memorizes the above-mentioned voice data download a new control program through a wireless circuit, The 1st or 2nd memory of the above which was prepared between the above-mentioned communications control means and the 1st and 2nd memory of the above, and between the above-mentioned sound recording playback control means and the 2nd and 1st memory of the above, and has memorized the above-mentioned control program for the above-mentioned communications control means, The change-over connecting means which makes change-over connection of the above-mentioned sound recording playback control means with the 2nd or 1st memory of the above which memorizes the above-mentioned voice data, While making change-over connection with the 2nd or 1st memory of the above which memorized the control program which had memorized the above-mentioned communications control means and newly downloaded voice data for it till then by the above-mentioned change-over connecting means after the above-mentioned download termination It is characterized by providing the change-over control means which makes change-over connection of the above-mentioned sound recording playback control means with the 1st or 2nd memory of the above which had memorized the control program till then.

[0011] The memory for memorizing the memory for memorizing the control program of such a configuration, then communication link actuation and the voice data for housesitting sound recording is both electrically constituted from rewritable nonvolatile memory. Since it becomes possible from a wireless circuit to download a new control program and mass work-piece memory etc. is not further needed by switching the access root to the memory at the time of download Without increasing a circuit scale by using an unnecessary circuit element, and raising product cost The control program about communication link actuation is downloaded and updated freely, and it becomes possible to perform version up for raising the correction and engine performance of the fault of a control program which the producer created.

[0012] The memory which invention according to claim 2 divides the control program and data of communication link actuation, and memorizes area and which becomes by rewritable nonvolatile memory electrically, The control means which controls terminal actuation according to the control program memorized by the above-mentioned memory, The download means which the area of the above-mentioned memory which had memorized data till then is made to download when a new control program is obtained through a wireless circuit, While addressing area which newly [ the above-mentioned memory ] downloaded the control data to the above-mentioned control means after the above-mentioned download termination It is characterized by providing an area change means to address so that the area which memorized the control program which

was using the above-mentioned memory till then may be made to memorize data.

[0013] By nonvolatile memory rewritable on such a configuration, then one electric target Since it constitutes as what shares the memory for memorizing the memory for memorizing the control program of communication link actuation, and the voice data for housesitting sound recording and the area location in the memory was controlled Though the switching element for switching two or more memory is eliminated, since it becomes possible from a wireless circuit to download a new control program and mass work-piece memory etc. is not further needed elsewhere at the time of download The control program about communication link actuation is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ], contributing to the miniaturization of equipment on a scale of a smaller circuit, and still enabling reduction of product cost.

[0014] The 1st memory group invention according to claim 3 remembers the control program of communication link actuation to be, respectively and which becomes by rewritable nonvolatile memory electrically, The 2nd memory which memorizes voice data and which becomes by rewritable nonvolatile memory electrically, Two or more control means which control communication link actuation according to the control program memorized by one to which it corresponds of the memory groups of the above 1st, respectively, While making the 2nd memory of the above memorize voice data, reading this and making it reproduce The sound recording playback control means which makes the 2nd memory of the above download the new control program obtained through the wireless circuit is provided. One of two or more above-mentioned control means It is characterized by making one to which it corresponds in the memory group of the above 1st carry out the updating storage of the control program downloaded in the 2nd memory of the above after the above-mentioned download termination.

[0015] The memory which constitutes electrically all the memory for memorizing such a configuration, then a control program, voice data in a circuit, etc. from rewritable nonvolatile memory, and memorizes voice data because maintenance takes temporarily Since it becomes possible from a wireless circuit to download the new control program for the control sections of arbitration and mass work-piece memory etc. is not further needed at the time of download Without increasing a circuit scale by using an unnecessary circuit element, and raising product cost The control program about the various actuation in a circuit is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ].

[0016]

[Embodiment of the Invention]

(Gestalt of the 1st operation) This invention is explained with reference to a drawing below about the gestalt of the 1st operation at the time of applying to the PHS terminal 10 which has a housesitting sound recording function.

[0017] Drawing 1 shows the outline configuration. Among drawing, 11 are an antenna and have connected a receive section 12 and the transmitting section 13 to this antenna 11 through the antenna switch which distributes transmission/reception and which is not illustrated. These receive sections 12 and the transmitting section 13 are what consists of the frequency-conversion section, the recovery section, or the modulation section. In a receive section 12 By inputting the signal inputted from the antenna 11 through the above-mentioned antenna switch, and mixing with the local oscillation signal of the predetermined frequency outputted from the PLL synthesizer 14 Carry out frequency conversion to the IF signal near 1MHz from a 1.9GHz band, restore to this IF signal in the recovery section, and it separates into IQ data. He makes it a data stream and is trying to transmit to the TDMA (Time Division Multiple Access: time division multiple access) section 15 of the next step.

[0018] After generating IQ data from the data transmitted from the TDMA section 15 and making this into the modulated wave of  $\pi/4$  shift QPSK in the modulation section, he carries out frequency conversion to a 1.9GHz band, and is trying to radiate from an antenna 11 through the above-mentioned antenna switch in the transmitting section 13 on the other hand by mixing with the local oscillation signal of the predetermined frequency outputted from the above-mentioned PLL synthesizer 14.

[0019] The TDMA section 15 is what performs frame synchronization and data format processing of a slot. In a receiving side The data for one slot to predetermined timing from the received data sent from the modulation section in a receive section 12 Drawing, After extracting unique WORD (synchronizing signal) out of this data, and taking frame synchronization and canceling the scramble of the control data section and the voice data section etc., delivery and voice data are transmitted to the communications control section 19 which mentions control data later at the speech processing section 16 and the sound recording playback control section 20.

[0020] On the other hand, in the transmitting side of the TDMA section 15, after adding control data etc. to the voice data sent from the speech processing section 16 and applying a scramble etc., unique WORD etc. is added, the transmit data for one slot is created, and it inserts in the predetermined slot in a frame to predetermined timing, and sends out to the modulation section in the above-mentioned transmitting section 13.

[0021] It is what operates in response to the control from the generalization control section 23 which the speech processing section 16 is constituted by the speech codec section and the PCM codec section, and is mentioned later. The speech codec section It is what performs compression/expanding processing of digital data. In a receiving side It elongates by decrypting the ADPCM voice data (4 bit x8kHz=32Kbps) sent from the TDMA section 15 or the sound recording playback control section 20 to PCM voice data (8 bit x8kHz=64Kbps), and outputs to the PCM codec section. On the other hand, in the transmitting side of the speech codec section, it compresses by encoding the PCM voice data sent from the PCM codec section to ADPCM voice data, and outputs to the above-mentioned TDMA section 15.

[0022] Moreover, the PCM codec section of the speech processing section 16 performs analog-to-digital-conversion processing, in the receiving side, it carries out D/A conversion of the PCM voice data sent from the speech codec section, outputs an analog sound signal to the loudspeaker 17 which constitutes an earphone, on the other hand, carries out A/D conversion of the analog sound signal inputted from the microphone 18 which constitutes a telephone transmitter from a transmitting side, and outputs the PCM voice data to the above-mentioned speech codec section.

[0023] The communications control section 19 manages control of communication link actuation [ in / with a receptacle / for the control from the generalization control section 23 / the above-mentioned PLL synthesizer 14 and the TDMA section 15 ] suitably based on the control program stored in either the 1st memory 21 mentioned later and the 2nd memory 22.

[0024] The sound recording playback control section 20 reads the ADPCM voice data which control housesitting sound recording / playback actuation under control of the generalization control section 23, and made either the 1st memory 21 and the 2nd memory 22 memorize the ADPCM voice data sent from the TDMA section 15, and any of this 1st memory 21 and the 2nd memory 22 or another side was made to memorize, and sends it out to the speech processing section 16.

[0025] The 1st memory 21 of the above and the 2nd memory 22 will both be constituted by the nonvolatile memory in which electric rewriting of a flash ROM, EEPROM, Ferroelectric RAM, etc. is possible, on the other hand, will memorize the control program of the above-mentioned communications control section 19, and will memorize the ADPCM voice data based on control of the sound recording playback control section 20 on the other hand.

[0026] The generalization control section 23 serves as a man machine interface while carrying out generalization control of this whole circuit corresponding to actuation of the user of this PHS terminal 10, and it performs transmission and reception of the above-mentioned communications control section 19 and control data while it sends out a control command to the above-mentioned sound recording playback control section 20 and the speech processing section 16 especially.

[0027] Next, actuation of the gestalt of the above-mentioned implementation is explained. It is inputted into a receive section 12 via an antenna 11, it gets over in this receive section 12, and the electric wave from the base station which is not illustrated at the time of the usual message is made into IQ data stream of baseband, and is transmitted to the TDMA section 15.

[0028] In the TDMA section 15, it separates into the control data section and the voice data

section from the data to which it restored, and the control data section is transmitted to the speech processing section 16, and the voice data section is transmitted to the speech processing section 16, respectively.

[0029] In the speech processing section 16 which received the voice data section, the voice data of digital value is changed into the signal of an analog, it outputs to a loudspeaker 17, and sound emission is carried out from this loudspeaker 17. On the other hand, after the speech processing section 16 digital-izes voice inputted with the microphone 18, it is sent out to the TDMA section 15. In the TDMA section 15, the transmit data of the slot unit which added the control data given to this voice data from the communications control section 19, and followed the predetermined transmitting format is created, and it inserts in the predetermined slot in a frame to predetermined timing, and sends out to the transmitting section 13.

[0030] He is trying to send out the transmitting section 13 to the base station which carries out frequency conversion after modulating the data transmitted from the TDMA section 15, and does not radiate and carry out [ above-mentioned ] illustration from an antenna 11.

[0031] During such a message, the communications control section 19 shall perform motion control of the PLL synthesizer 14 and the TDMA section 15 so that it may perform establishment of a message, continuation, and closing in the procedure based on the control program stored in the 1st memory 21.

[0032] Next, sound recording actuation in the condition of having set the housesitting sound recording function is explained. When there is arrival of the mail in the condition of having set the housesitting sound recording function, it is inputted into a receive section 12 via an antenna 11, it gets over in this receive section 12, and the electric wave from the base station which is not illustrated is made into IQ data stream of baseband, and is transmitted to the TDMA section 15.

[0033] In the TDMA section 15, it separates into the control data section and the voice data section from the data to which it restored as well as the time of the usual message, and the speech processing section 16 is especially attained to speech processing section 16 in the voice data section, and the control data section is transmitted to it also to the sound recording playback control section 20 again, respectively at the time of this housesitting sound recording functional set.

[0034] The sound recording playback control section 20 makes the 2nd memory 22 carry out the sequential storage of the voice data (ADPCM voice data) sent from the TDMA section 15 by the time amount length set up beforehand.

[0035] At this time, the communications control section 19 shall perform motion control of the PLL synthesizer 14 and the TDMA section 15 so that it may perform establishment of a message, continuation, and closing in the procedure based on the control program stored in the 1st memory 21 like the time of the above-mentioned usual message.

[0036] The sound recording termination back [ loudspeaker / 17 ], if playback of the voice data memorized through the generalization control section 23 is directed, the sound recording playback control section 20 will read the voice data which the 2nd memory 22 was made to memorize one by one, will send it out to the speech processing section 16, and will carry out a playback output.

[0037] Subsequently, the actuation at the time of downloading the data of the control program of new communication link actuation by the wireless circuit through the base station which is not illustrated is explained. In this case, it gets over through an antenna 11 and a receive section 12, it is recognized by the TDMA section 15 that it is data of a new control program, and the downloaded data are sent out to the sound recording playback control section 20.

[0038] The sound recording playback control section 20 carries out the sequential storage of the sent data of a new control program from the low address position to the 2nd memory 22 which was being used for storage of voice data till then. And when the 2nd memory 22 is made to memorize all the sent data of a new control program, it means completing download of this control program, and the communications control section 19 opens a wireless circuit.

[0039] During activation of the above-mentioned download, the communications control section 19 performs motion control according to the control program of the communication link actuation memorized by the 1st memory 21, when download is completed, it accesses the 2nd



memory 22 which memorized a new control program, and it operates according to the control program memorized by this 2nd memory 22 after that.

[0040] When the sound recording playback control section 20 also receives voice data from the TDMA section 15 after that, the 1st memory 21 is made to memorize the voice data in connection with this. Drawing 2 illustrates the concrete circuitry for switching the function of the 1st memory 21 and the 2nd memory 22 by the above-mentioned communications control section 19, and arranges multiplexers 31-34 between the communications control section 19 and the sound recording playback control section 20, the 1st memory 21, and the 2nd memory 22.

[0041] These multiplexers 31-34 interlock, respectively, and multiplexers 31 and 32 and multiplexers 33 and 34 carry out change-over actuation, and carry out change-over actuation of them with the above-mentioned change-over signal by which multiplexers 31 and 32 were reversed with the change-over signal from the direct communication control section 19, and multiplexers 33 and 34 were reversed with the inverter 35.

[0042] A multiplexer 32 However, for the address input to the 1st memory 21 from the communications control section 19 or the sound recording playback control section 20, For the output to the communications control section 19 or the sound recording playback control section 20 of data to which the multiplexer 31 has been read from the 1st memory 21, A multiplexer 33 For the address input to the 2nd memory 22 from the communications control section 19 or the sound recording playback control section 20, It is that from which a multiplexer 34 becomes an output to the communications control section 19 or the sound recording playback control section 20 of data read from the 2nd memory 22. Multiplexers 31 and 32 are connected to the communications control section 19 side all over [ both ] drawing. Both the multiplexers 33 and 34 are connected to the sound recording playback control-section 20 side, and the condition that the control program of the communications control section 19 is memorized by the 1st memory 21, and the voice data of the sound recording playback control section 20 is memorized by the 2nd memory 22 is shown.

[0043] In this case, the change-over signal to multiplexers 31-34 shall be based on the port output of the communications control section 19, makes the 2nd memory 22 memorize the downloaded new control program, and once resets the communications control section 19. It depends for the actuation immediately after the discharge on the control program of the origin memorized by the 1st memory 21. It is working and the version of the control program which is alike, respectively and is memorized by the thing [ accessing the specific address of the 1st memory 21 and the 2nd memory 22 ] is decoded. The contents of the change-over signal to the above-mentioned multiplexers 31-34 shall be determined in order to start the actuation using a new control program. Therefore, processing to which the sound recording playback control section 20 does not write voice data in the above-mentioned specific address of the 1st memory 21 just behind this change-over actuation is needed.

[0044] Thus, the memory for memorizing the memory for memorizing the control program of communication link actuation and the voice data for housesitting sound recording according to the gestalt of implementation of the above 1st is both electrically constituted from rewritable nonvolatile memory. Since it becomes possible from a wireless circuit to download a new control program and mass work-piece memory etc. is not further needed by switching the access root to the memory at the time of download Without increasing a circuit scale by using an unnecessary circuit element, and raising product cost The control program about communication link actuation is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ].

[0045] In addition, although the change-over signal to multiplexers 31-34 was explained as the communications control section 19 outputting as above-mentioned drawing 2 showed, it is good also as what replaces with the communications control section 19 and the generalization control section 23 outputs as shown in drawing 3.

[0046] In this case, if the communications control section 19 notifies having started download of a new control program to the generalization control section 23, while the generalization control section 23 will apply reset to the communications control section 19 at the time of download

termination, actuation of the communications control section 19 by the new control program can be made to start immediately by reversing the change-over signal to multiplexers 31-34, and canceling the reset to the communications control section 19.

[0047] (Gestalt of the 2nd operation) This invention is explained with reference to a drawing below about the gestalt of the 2nd operation at the time of applying to the PHS terminal 40 which has a housesitting sound recording function.

[0048] Since drawing 4 is the same as that of what shows the outline configuration and was fundamentally shown by above-mentioned drawing 1, the same sign is given to the same part and the explanation is omitted. However, it replaces with the 1st memory 21 and the 2nd memory 22 in above-mentioned drawing 1. One memory 41 which becomes by rewritable nonvolatile memory electrically is arranged. In this memory 41, shall divide a storage area and the control program and voice data of communication link actuation shall be memorized. Moreover, suppose that all motion control of the writing (at the time of sound recording)/read-out of the voice data to the memory 41 by the control sound recording playback control section 20 in above-mentioned drawing 1 (at the time of playback) is carried out by replacing with the sound recording playback control section 20, and communications control section 19' serving.

[0049] That both control of the communication link actuation which communications control section 19' performs here based on the control program read from memory 41, and the writing / read-out control to the memory 41 of voice data can be performed After making memory 41 memorize the voice data which the control data and voice data in one frame which received in the TDMA section 15 are separated, and must be processed on real time with the frame concerned, before the frame and following frame Since what is necessary is just to perform frame creation of control data which should transmit the received control data to decode and a degree, it is for processing not to overlap in time.

[0050] Drawing 5 shows the processing timing and drawing 5 (1) shows the receiving frame in an input signal. Communications control section 19' makes the area concerned of memory 41 carry out the sequential storage of the voice data separated in the TDMA section 15 as shown in drawing 5 (2) immediately to this receiving frame. And when a receiving frame is completed and it finished memorizing all the separated voice data in memory 41, communications processing, such as creation of control data which transmits the control data separated in the TDMA section 15 with decode and the following transmitting frame, is performed until the next receiving frame period comes so that it may be shown subsequently to drawing 5 (3).

[0051] The above-mentioned memory 41 has taken the configuration of a memory area as shown in drawing 6. The control program of fundamental communication link actuation which is not influenced by version up etc. in the address area of the head is memorized fixed. With the control program of the fundamental communication link actuation same with the area on the next address space As rewriting of the data containing the jump address mentioned later is enabled, it memorizes and the address space which remains is carried out for 2 minutes, the 1st area and 2nd area are prepared. The control program of the communication link actuation corresponding to [ in these 1st and 2nd area ] the version at that time to one of these will be memorized, and the voice data for a housesitting sound recording function will be memorized by another side.

[0052] Next, actuation of the gestalt of the above-mentioned implementation is explained. However, although it is in this PHS terminal 40, and that explanation is omitted since the actuation at the time of the usual message is the same as that of the case of the gestalt of implementation of the above 1st, communications control section 19' controls communication link actuation according to the control program memorized by either the primary control program memorized by memory 41 or the 1st and 2nd area.

[0053] Moreover, at the time of actuation of a housesitting sound recording function, an antenna 11 and the voice data (ADPCM voice data) separated from the input signal in the TDMA section 15 through the receive section 12 are written in the other side of the 1st and 2nd area of memory 41 one by one by the time amount length to which communications control section 19' is beforehand set as sound recording actuation.

[0054] The sound recording actuation termination back [ loudspeaker / 17 ], if playback of the voice data memorized in memory 41 through the generalization control section 23 is directed,

communications control section 19' will read the voice data made to memorize to the other side of the 1st and 2nd area of memory 41 one by one, will send it out to the speech processing section 16, and will carry out a playback output.

[0055] Subsequently, the actuation at the time of downloading the data of the control program of new communication link actuation by the wireless circuit is explained using drawing 7. In this case, at the initiation time of operation, voice data shall be memorized in the data of the control program of communication link actuation in memory 41, for example, the 1st area, and the 2nd area.

[0056] It gets over through an antenna 11 and a receive section 12, it is recognized by the TDMA section 15 that it is data of a new control program, and the downloaded data are sent out to communications control section 19'.

[0057] Communications control section 19' carries out the sequential storage of the sent data of a new control program from the low address position to the 2nd area of the primary control program memorized by memory 41 and the memory 41 which was being used for storage of voice data till then according to the control program memorized in the 1st area (step S1).

[0058] When all the sent data of a new control program are judged that it made the 2nd area of memory 41 memorize, communications control section 19' And the (step S2), While completing download of this control program and opening a wireless circuit A rewriting setup of the jump address currently held in the area which can rewrite the primary control program memorized by memory 41 is carried out from the start address of the 1st area at the start address of the 2nd area (step S3).

[0059] Then, communications control section 19' sends out the signal which requires reset from the generalization control section 23 (step S4), and it stands by that a reset signal is sent from the generalization control section 23 corresponding to this signal (step S5).

[0060] And when a reset signal is actually received from the generalization control section 23 Communications control section 19' is reset including various temporary data memorized inside. According to the primary control program of memory 41, and the control program from the start address of the 2nd area corresponding to the jump address which carried out a rewriting setup at the above-mentioned step S3 contained in this primary control program, control of communication link actuation is started anew (step S6). Processing of this drawing 7 is ended above and it shifts to the processing according to the directions from the generalization control section 23.

[0061] When communications control section 19' receives voice data from the TDMA section 15 after that in connection with this at the time of activation of a timed-recording sound function, the 1st area is made to memorize the voice data.

[0062] According to the gestalt of implementation of the above 2nd, thus, by nonvolatile memory rewritable on one electric target Since it constitutes as what shares the memory for memorizing the memory for memorizing the control program of communication link actuation, and the voice data for housesitting sound recording and the memory area location was controlled Though switching elements, such as the multiplexers 31-34 for switching memory as shown with the gestalt of implementation of the above 1st, are eliminated, it becomes possible from a wireless circuit to download a new control program.

[0063] Moreover, the control program about communication link actuation is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ], contributing to the miniaturization of equipment on a scale of a smaller circuit, and still enabling reduction of product cost, since mass work-piece memory etc. is not elsewhere needed at the time of download.

[0064] (Gestalt of the 3rd operation) This invention is explained with reference to a drawing below about the gestalt of the 3rd operation at the time of applying to the PHS terminal 50 which has a housesitting sound recording function.

[0065] Since drawing 8 is the same as that of what shows the outline configuration and was fundamentally shown by above-mentioned drawing 1, the same sign is given to the same part and the explanation is omitted. A deer is carried out and 1st ROM51 which memorizes the processing algorithm and control program of this speech processing section 16, and 1st RAM52

used as the work area at the time of data processing of this speech processing section 16 are connected to the speech processing section 16.

[0066] Moreover, 2nd ROM53 which memorized each control program, such as wireless management which this communications control section 19 performs, migration management, and preliminary control, and 2nd RAM54 used as the work area at the time of data processing of this communications control section 19 are connected to the communications control section 19.

[0067] Furthermore, 3rd ROM55 which remembers the digitized voice data held to the arrival-of-the-mail response message of housesitting sound recording and the 3rd above RAM 56 after this message to be 3rd RAM56 which holds digitized voice data temporarily at the time of the message of housesitting sound recording is connected to the sound recording playback control section 20.

[0068] And 4th ROM57 which memorized the control program of this generalization control section 23, and 4th RAM58 used as the work area of this generalization control section 23 are connected to the generalization control section 23.

[0069] Next, actuation of the gestalt of the above-mentioned implementation is explained. Here, the actuation at the time of downloading a new control program through the base station which this PHS terminal 50 does not illustrate to either the 1st above ROM 51, 2nd ROM53, 3rd ROM55 and 4th ROM57 is explained.

[0070] Drawing 9 shows the configuration of the data to download and the whole data consists of a header 101 and data division 102. Among these, the rewriting identifier 103 which shows that it is download for control program rewriting of this data, the length 104 which shows the capacity of the data to download, the ROM number section 105 which shows of which ROM rewriting is performed, and the rewriting starting address section 106 which shows the rewriting starting address of ROM used as the candidate for rewriting are described by the header 101. Moreover, the train of the actually rewritten control program is continuously described by data division 102.

[0071] A deer is carried out, and if it gets over via an antenna 11 and a receive section 12 and the download data from a base station are outputted to the TDMA section 15, the TDMA section 15 will detect the rewriting identifier 103 of the header 101 in the header 101 of data, and will transmit the contents of the header 101 to the communications control section 19. The communications control section 19 which received this transmits the contents of the header 101 to the generalization control section 23 of a high order further.

[0072] The generalization control section 23 performs a store instruction and directions of storing initiation address data so that the output of the TDMA section 15 may be stored in 3rd ROM55 to the sound recording playback control section 20, while performing the root directions to 3rd ROM55 for recognizing download initiation of a control program by the rewriting identifier 103 sent first, and carrying out the temporary storage of the data to download to the communications control section 19.

[0073] In response to the root directions from the generalization control section 23, the communications control section 19 operates the TDMA section 15 so that the data from the TDMA section 15 may be outputted to the sound recording playback control section 20.

[0074] The sound recording playback control section 20 stores the output from the TDMA section 15 in 3rd ROM55 according to the storing starting address directed to the generalization control section 23. Storing in this 3rd ROM55 is continuously performed by the data length shown with length 104, ends download of control data after storing of the data for this data length, and cancels connection with the base station by the antenna 11, the receive section 12, and the TDMA section 15.

[0075] Then, the generalization control section 23 transmits the download data stored in 3rd ROM55 to either 1st ROM51 and 2nd ROM53 which actually rewrite a control program, and 4th ROM57.

[0076] In this case, the generalization control section 23 checks the destination by reading the ROM number section 105 in a header 101, transmits the transport agent subsequently beforehand stored in 4th ROM57 in advance of initiation of a transfer to 4th RAM58, accesses the field of 4th transmitted RAM58, and starts this transport agent. Next, either of speech

processing section [ which is connected with ROM for rewriting ] 16, communications control section 19, and generalization control-section 23 serves is made to shift to a transfer receive state. In addition, in response to transfer condition shift directions of the generalization control section 23, a transfer receive state here is transmitted to RAM which has connected the transport agent in ROM which has connected too, and means each control section accessing the field of transmitted RAM, and starting a transfer receiving agent.

[0077] In this way, by both the transport agent of the source and the transport agent of the destination being started, the generalization control section 23 controls the sound recording playback control section 20, and performs the transport agent shown in drawing 10 . That is, the generalization control section 23 sends out the transfer request of the header 101 of the data of the control program downloaded to the sound recording playback control section 20 with reference to the download starting address of 3rd ROM55 (step A1) (step A2).

[0078] Subsequently, when it judges that receiving this header 101 from the sound recording playback control section 20 to this demand stood by and (step A3) received, the part in this header 101 which contains the ROM number section 105 and the rewriting starting address section 106 at least is analyzed (step A4), and the rewriting initiation instruction of ROM linked to the control section of a rewriting place is outputted (step A5).

[0079] Then, when it stands by (step A6) and judges that it was outputted by that the response from the control section of a rewriting place is outputted, that the rewriting starting address section 106 should be transmitted to the control section of a rewriting place, it sends out (step A7) and the SEND statement of the data division 102 of the next address currently continuously held to the sound recording playback control section 20 at 3rd ROM55 is outputted (step A8).

[0080] And when it judges that reception of the data division 102 sent from data division 102 corresponding to this this SEND statement stood by and (step A9) received, those data division 102 that received are transmitted to the control section of a rewriting place (step A10).

[0081] a \*\*\*\*\* [ that there are data division 102 which should still be transmitted when it stands by (step A11) and judges that it has been sent by that the signal of the completion of reception is sent from the control section of a rewriting place corresponding to this transmission ] -- judging (step A12) -- being certain -- \*\* -- when it judges, all the data divisions 102 are transmitted to the control section of a rewriting place by repeating and performing processing from the above-mentioned step A8 again.

[0082] And if it judges that there are already no data division 102 which should be transmitted at the above-mentioned step A12, the signal of transfer termination will be sent out to the control section of a rewriting place (step A13), and activation of the transport agent by this generalization control section 23 will be ended above.

[0083] It comes to perform a transfer receiving agent as shown in drawing 11 with the ROM rewriting instruction received from the generalization control section 23 in above-mentioned step A5 on the other hand in the control section of the rewriting place which receives the data from this generalization control section 23.

[0084] Namely, the control section of a rewriting place answers the above-mentioned ROM rewriting instruction first, and receives the generalization control section 23. After sending out the signal which shows that starting of this transfer receiving agent was completed (step B1), It stands by that the above-mentioned rewriting starting address section 106 is shortly sent from the sound recording playback control section 20 (step B-2). When it judges that this was received, the contents of (step B3) and its rewriting starting address section 106 which received are set as the control address of ROM of a rewriting place (step B4).

[0085] Then, it stands by that the data division 102 which correspond from the generalization control section 23 are transmitted (step B5). When it judged that this was received, after holding (step B6) and its data division 102 which received to RAM which has once connected A write-in setup of the data division 102 which checked that the contents of the data were not the signals which show transfer termination (step B7), and were held to RAM is carried out at ROM of a rewriting place (step B8).

[0086] Subsequently, the signal which shows the completion of reception to the generalization control section 23 is outputted (step B9), and after carrying out a renewal setup of the rewriting

address of ROM of "+1", a write-in setup of all the data divisions 102 sent is carried out at ROM by (step B10) and repeating and performing processing from above-mentioned step B5 again.

[0087] And if it judges that the data received at the above-mentioned step B7 are the signal of transfer termination, activation of the transfer receiving agent by this control section will be ended above.

[0088] Drawing 12 indicates the path of the data downloaded in the case of rewriting the contents of 1st ROM51 by the partition by the thick wire. Similarly, drawing 13 indicates the path of the data downloaded in the case of rewriting the contents of 2nd ROM53 by the partition by the thick wire.

[0089] Drawing 14 indicates the path of the data downloaded in the case of rewriting the contents of 4th ROM57 by the partition by the thick wire, and since especially ROM of a rewriting place is 4th ROM57 and the contents of 4th ROM57 to which generalization control-section 23 self which started the transport agent is connected will be rewritten in this case, it becomes unnecessary moreover, to newly start a transfer receiving agent.

[0090] According to the gestalt of implementation of the above 3rd, the memory which constitutes electrically all the memory for memorizing a control program, voice data, etc. in a circuit from rewritable nonvolatile memory, and memorizes voice data by thus, the thing done to maintenance temporarily Since it becomes possible from a wireless circuit to download the new control program for the control sections of arbitration and mass work-piece memory etc. is not further needed at the time of download Without increasing a circuit scale by using an unnecessary circuit element, and raising product cost The control program about the various actuation in a circuit is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ].

[0091] In addition, although each gestalt of the above 1st thru/or the 3rd implementation is illustrated about the case where it applies to a PHS terminal, if it is the pocket communication terminal machine which has the function which this invention is not limited to it, but records voice, and is reproduced, otherwise, of course, it can apply to digital one/analog cellular phone, a specific smallness power transceiver, etc. In addition, let this invention be what has possible deforming variously and carrying out within limits which do not deviate from the summary.

[0092]

[Effect of the Invention] The memory for memorizing the memory for memorizing the control program of communication link actuation and the voice data for housesitting sound recording according to invention according to claim 1 is both electrically constituted from rewritable nonvolatile memory. Since it becomes possible from a wireless circuit to download a new control program and mass work-piece memory etc. is not further needed by switching the access root to the memory at the time of download Without increasing a circuit scale by using an unnecessary circuit element, and raising product cost The control program about communication link actuation is downloaded and updated freely, and it becomes possible to perform version up for raising the correction and engine performance of the fault of a control program which the producer created.

[0093] According to invention according to claim 2, by nonvolatile memory rewritable on one electric target Since it constitutes as what shares the memory for memorizing the memory and data for memorizing the control program of communication link actuation and the area location in the memory was controlled Though the switching element for switching two or more memory is eliminated, since it becomes possible from a wireless circuit to download a new control program and mass work-piece memory etc. is not further needed elsewhere at the time of download The control program about communication link actuation is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ], contributing to the miniaturization of equipment on a scale of a smaller circuit, and still enabling reduction of product cost.

[0094] According to invention according to claim 3, the memory which constitutes electrically all the memory for memorizing a control program, voice data, etc. in a circuit from rewritable nonvolatile memory, and memorizes voice data because maintenance takes temporarily Since it

becomes possible from a wireless circuit to download the new control program for the control sections of arbitration and mass work-piece memory etc. is not further needed at the time of download Without increasing a circuit scale by using an unnecessary circuit element, and raising product cost The control program about the various actuation in a circuit is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ].

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[Translation done.]

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TECHNICAL FIELD

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[Field of the Invention] This invention has the function which records voice and is reproduced, for example, relates to pocket communication terminal machines, such as a PHS terminal and a specific smallness power transceiver.

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[Translation done.]



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PRIOR ART

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[Description of the Prior Art] For example, with pocket communication terminal machines, such as a PHS terminal, and a digital cellular phone, a specific smallness power transceiver, the control program required for communication link actuation currently used for the current general target is memorized by semiconductor memory fixed. In this case, it is used as what being used as semiconductor memory does not specifically have the need for nonvolatile memory's power-source backup of both EPROM, a flash ROM EEPROM a mask ROM the ferroelectric RAM, etc., therefore does not consume power vainly.

[0003] However, among the nonvolatile memory which carried out [ above-mentioned ] listing, rewritable things are a flash ROM, EEPROM, and Ferroelectric RAM electrically about the contents of storage, and when [ these ] rewritable nonvolatile memory is used electrically, it is thought possible to update the control program about communication link actuation by transmission and reception of for example, wireless data by version up etc.

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EFFECT OF THE INVENTION

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[Effect of the Invention] The memory for memorizing the memory for memorizing the control program of communication link actuation and the voice data for housesitting sound recording according to invention according to claim 1 is both electrically constituted from rewritable nonvolatile memory. Since it becomes possible from a wireless circuit to download a new control program and mass work-piece memory etc. is not further needed by switching the access root to the memory at the time of download Without increasing a circuit scale by using an unnecessary circuit element, and raising product cost The control program about communication link actuation is downloaded and updated freely, and it becomes possible to perform version up for raising the correction and engine performance of the fault of a control program which the producer created.

[0093] According to invention according to claim 2, by nonvolatile memory rewritable on one electric target Since it constitutes as what shares the memory for memorizing the memory and data for memorizing the control program of communication link actuation and the area location in the memory was controlled Though the switching element for switching two or more memory is eliminated, since it becomes possible from a wireless circuit to download a new control program and mass work-piece memory etc. is not further needed elsewhere at the time of download The control program about communication link actuation is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ], contributing to the miniaturization of equipment on a scale of a smaller circuit, and still enabling reduction of product cost.

[0094] According to invention according to claim 3, the memory which constitutes electrically all the memory for memorizing a control program, voice data, etc. in a circuit from rewritable nonvolatile memory, and memorizes voice data because maintenance takes temporarily Since it becomes possible from a wireless circuit to download the new control program for the control sections of arbitration and mass work-piece memory etc. is not further needed at the time of download Without increasing a circuit scale by using an unnecessary circuit element, and raising product cost The control program about the various actuation in a circuit is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ].

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] However, it is the thing which is making rewritable nonvolatile memory memorize a control program electrically. In downloading the control program about communication link actuation by transmission and reception of wireless data and actually updating it by version up etc. In the usual communication link actuation, to the extent that it is unnecessary is [ mass work-piece memory ] needed, it will be very disadvantageous to have such mass work-piece memory beforehand, in order to perform version up etc. in respect of cost, and the price of the pocket communication terminal machine itself will also be influenced. [0005] Moreover, if a pocket communication terminal machine is carried into a service center, even if nonvolatile memory cannot rewrite electrically, it is possible by exchanging the nonvolatile memory itself or rewriting the contents of storage to also make a control program update.

[0006] Since the time and effort for carrying a terminal into a service center in that case and a considerable period are needed and a terminal cannot be used in the meantime, it becomes impossible updating a control program freely and however, to say.

[0007] By the way, in pocket communication terminal machines, such as a PHS terminal and a digital cellular phone, have a sound recording regenerative function, and digital-data-ize business from the calling party in the condition that it cannot respond to arrival of the mail, it is made to memorize, and there are some which can check business by reproducing the contents of storage at the next arbitration time. Nonvolatile memory, such as a flash ROM, EEPROM, and Ferroelectric RAM, is too used as a storage by this kind of sound recording regenerative function.

[0008] Therefore, in the pocket communication terminal machine which has a sound recording regenerative function, although nonvolatile memory of the same kind will be used, respectively for two applications, the object for storage of a control program, and the object for digitized voice data storages, these are restricting and using the application mutually in a circuit, and are not used for other applications.

[0009] The place which this invention was made in view of the above actual condition, and is made into the purpose With the pocket communication terminal machine which has a sound recording regenerative function, the nonvolatile memory of the same kind used for two applications, the object for storage of a control program and the object for digitized voice data storages, is utilized effectively. It is in offering the pocket communication terminal machine which can download and update the control program about communication link actuation freely, without needing mass work-piece memory etc.

[0010]

[The technical problem which The means for solving a technical problem invention tends to solve] The 1st memory invention according to claim 1 remembers the control program of communication link actuation, or one side of voice data to be and which becomes by rewritable nonvolatile memory electrically, The 2nd memory which memorizes another side of the above-mentioned control program or voice data and which becomes by rewritable nonvolatile memory electrically, The communications control means which controls communication link actuation according to the control program memorized by the 1st or 2nd memory of the above, While

making the 2nd or 1st memory of the above memorize voice data, reading this and making it reproduce The sound recording playback control means which makes the 2nd or 1st memory of the above which memorizes the above-mentioned voice data download a new control program through a wireless circuit, The 1st or 2nd memory of the above which was prepared between the above-mentioned communications control means and the 1st and 2nd memory of the above, and between the above-mentioned sound recording playback control means and the 2nd and 1st memory of the above, and has memorized the above-mentioned control program for the above-mentioned communications control means, The change-over connecting means which makes change-over connection of the above-mentioned sound recording playback control means with the 2nd or 1st memory of the above which memorizes the above-mentioned voice data, While making change-over connection with the 2nd or 1st memory of the above which memorized the control program which had memorized the above-mentioned communications control means and newly downloaded voice data for it till then by the above-mentioned change-over connecting means after the above-mentioned download termination It is characterized by providing the change-over control means which makes change-over connection of the above-mentioned sound recording playback control means with the 1st or 2nd memory of the above which had memorized the control program till then.

[0011] The memory for memorizing the memory for memorizing the control program of such a configuration, then communication link actuation and the voice data for housesitting sound recording is both electrically constituted from rewritable nonvolatile memory. Since it becomes possible from a wireless circuit to download a new control program and mass work-piece memory etc. is not further needed by switching the access root to the memory at the time of download Without increasing a circuit scale by using an unnecessary circuit element, and raising product cost The control program about communication link actuation is downloaded and updated freely, and it becomes possible to perform version up for raising the correction and engine performance of the fault of a control program which the producer created.

[0012] The memory which invention according to claim 2 divides the control program and data of communication link actuation, and memorizes area and which becomes by rewritable nonvolatile memory electrically, The control means which controls terminal actuation according to the control program memorized by the above-mentioned memory, The download means which the area of the above-mentioned memory which had memorized data till then is made to download when a new control program is obtained through a wireless circuit, While addressing area which newly [ the above-mentioned memory ] downloaded the control data to the above-mentioned control means after the above-mentioned download termination It is characterized by providing an area change means to address so that the area which memorized the control program which was using the above-mentioned memory till then may be made to memorize data.

[0013] By nonvolatile memory rewritable on such a configuration, then one electric target Since it constitutes as what shares the memory for memorizing the memory for memorizing the control program of communication link actuation, and the voice data for housesitting sound recording and the area location in the memory was controlled Though the switching element for switching two or more memory is eliminated, since it becomes possible from a wireless circuit to download a new control program and mass work-piece memory etc. is not further needed elsewhere at the time of download The control program about communication link actuation is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ], contributing to the miniaturization of equipment on a scale of a smaller circuit, and still enabling reduction of product cost.

[0014] The 1st memory group invention according to claim 3 remembers the control program of communication link actuation to be, respectively and which becomes by rewritable nonvolatile memory electrically, The 2nd memory which memorizes voice data and which becomes by rewritable nonvolatile memory electrically, Two or more control means which control communication link actuation according to the control program memorized by one to which it corresponds of the memory groups of the above 1st, respectively, While making the 2nd memory of the above memorize voice data, reading this and making it reproduce The sound recording playback control means which makes the 2nd memory of the above download the new control

program obtained through the wireless circuit is provided. One of two or more above-mentioned control means It is characterized by making one to which it corresponds in the memory group of the above 1st carry out the updating storage of the control program downloaded in the 2nd memory of the above after the above-mentioned download termination.

[0015] The memory which constitutes electrically all the memory for memorizing such a configuration, then a control program, voice data in a circuit, etc. from rewritable nonvolatile memory, and memorizes voice data because maintenance takes temporarily Since it becomes possible from a wireless circuit to download the new control program for the control sections of arbitration and mass work-piece memory etc. is not further needed at the time of download Without increasing a circuit scale by using an unnecessary circuit element, and raising product cost The control program about the various actuation in a circuit is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ].

[0016]

[Embodiment of the Invention]

(Gestalt of the 1st operation) This invention is explained with reference to a drawing below about the gestalt of the 1st operation at the time of applying to the PHS terminal 10 which has a housesitting sound recording function.

[0017] Drawing 1 shows the outline configuration. Among drawing, 11 are an antenna and have connected a receive section 12 and the transmitting section 13 to this antenna 11 through the antenna switch which distributes transmission/reception and which is not illustrated. These receive sections 12 and the transmitting section 13 are what consists of the frequency-conversion section, the recovery section, or the modulation section. In a receive section 12 By inputting the signal inputted from the antenna 11 through the above-mentioned antenna switch, and mixing with the local oscillation signal of the predetermined frequency outputted from the PLL synthesizer 14 Carry out frequency conversion to the IF signal near 1MHz from a 1.9GHz band, restore to this IF signal in the recovery section, and it separates into IQ data. He makes it a data stream and is trying to transmit to the TDMA (Time Division Multiple Access: time division multiple access) section 15 of the next step.

[0018] After generating IQ data from the data transmitted from the TDMA section 15 and making this into the modulated wave of  $\pi/4$  shift QPSK in the modulation section, he carries out frequency conversion to a 1.9GHz band, and is trying to radiate from an antenna 11 through the above-mentioned antenna switch in the transmitting section 13 on the other hand by mixing with the local oscillation signal of the predetermined frequency outputted from the above-mentioned PLL synthesizer 14.

[0019] The TDMA section 15 is what performs frame synchronization and data format processing of a slot. In a receiving side The data for one slot to predetermined timing from the received data sent from the modulation section in a receive section 12 Drawing, After extracting unique WORD (synchronizing signal) out of this data, and taking frame synchronization and canceling the scramble of the control data section and the voice data section etc., delivery and voice data are transmitted to the communications control section 19 which mentions control data later at the speech processing section 16 and the sound recording playback control section 20.

[0020] On the other hand, in the transmitting side of the TDMA section 15, after adding control data etc. to the voice data sent from the speech processing section 16 and applying a scramble etc., unique WORD etc. is added, the transmit data for one slot is created, and it inserts in the predetermined slot in a frame to predetermined timing, and sends out to the modulation section in the above-mentioned transmitting section 13.

[0021] It is what operates in response to the control from the generalization control section 23 which the speech processing section 16 is constituted by the speech codec section and the PCM codec section, and is mentioned later. The speech codec section It is what performs compression/expanding processing of digital data. In a receiving side It elongates by decrypting the ADPCM voice data (4 bit x8kHz=32Kbps) sent from the TDMA section 15 or the sound recording playback control section 20 to PCM voice data (8 bit x8kHz=64Kbps), and outputs to the PCM codec section. On the other hand, in the transmitting side of the speech codec section,

it compresses by encoding the PCM voice data sent from the PCM codec section to ADPCM voice data, and outputs to the above-mentioned TDMA section 15.

[0022] Moreover, the PCM codec section of the speech processing section 16 performs analog-to-digital-conversion processing, in the receiving side, it carries out D/A conversion of the PCM voice data sent from the speech codec section, outputs an analog sound signal to the loudspeaker 17 which constitutes an earphone, on the other hand, carries out A/D conversion of the analog sound signal inputted from the microphone 18 which constitutes a telephone transmitter from a transmitting side, and outputs the PCM voice data to the above-mentioned speech codec section.

[0023] The communications control section 19 manages control of communication link actuation [ in / with a receptacle / for the control from the generalization control section 23 / the above-mentioned PLL synthesizer 14 and the TDMA section 15 ] suitably based on the control program stored in either the 1st memory 21 mentioned later and the 2nd memory 22.

[0024] The sound recording playback control section 20 reads the ADPCM voice data which control housesitting sound recording / playback actuation under control of the generalization control section 23, and made either the 1st memory 21 and the 2nd memory 22 memorize the ADPCM voice data sent from the TDMA section 15, and any of this 1st memory 21 and the 2nd memory 22 or another side was made to memorize, and sends it out to the speech processing section 16.

[0025] The 1st memory 21 of the above and the 2nd memory 22 will both be constituted by the nonvolatile memory in which electric rewriting of a flash ROM, EEPROM, Ferroelectric RAM, etc. is possible, on the other hand, will memorize the control program of the above-mentioned communications control section 19, and will memorize the ADPCM voice data based on control of the sound recording playback control section 20 on the other hand.

[0026] The generalization control section 23 serves as a man machine interface while carrying out generalization control of this whole circuit corresponding to actuation of the user of this PHS terminal 10, and it performs transmission and reception of the above-mentioned communications control section 19 and control data while it sends out a control command to the above-mentioned sound recording playback control section 20 and the speech processing section 16 especially.

[0027] Next, actuation of the gestalt of the above-mentioned implementation is explained. It is inputted into a receive section 12 via an antenna 11, it gets over in this receive section 12, and the electric wave from the base station which is not illustrated at the time of the usual message is made into IQ data stream of baseband, and is transmitted to the TDMA section 15.

[0028] In the TDMA section 15, it separates into the control data section and the voice data section from the data to which it restored, and the control data section is transmitted to the speech processing section 16, and the voice data section is transmitted to the speech processing section 16, respectively.

[0029] In the speech processing section 16 which received the voice data section, the voice data of digital value is changed into the signal of an analog, it outputs to a loudspeaker 17, and sound emission is carried out from this loudspeaker 17. On the other hand, after the speech processing section 16 digital-data-izes voice inputted with the microphone 18, it is sent out to the TDMA section 15. In the TDMA section 15, the transmit data of the slot unit which added the control data given to this voice data from the communications control section 19, and followed the predetermined transmitting format is created, and it inserts in the predetermined slot in a frame to predetermined timing, and sends out to the transmitting section 13.

[0030] He is trying to send out the transmitting section 13 to the base station which carries out frequency conversion after modulating the data transmitted from the TDMA section 15, and does not radiate and carry out [ above-mentioned ] illustration from an antenna 11.

[0031] During such a message, the communications control section 19 shall perform motion control of the PLL synthesizer 14 and the TDMA section 15 so that it may perform establishment of a message, continuation, and closing in the procedure based on the control program stored in the 1st memory 21.

[0032] Next, sound recording actuation in the condition of having set the housesitting sound

recording function is explained. When there is arrival of the mail in the condition of having set the housesitting sound recording function, it is inputted into a receive section 12 via an antenna 11, it gets over in this receive section 12, and the electric wave from the base station which is not illustrated is made into IQ data stream of baseband, and is transmitted to the TDMA section 15. [0033] In the TDMA section 15, it separates into the control data section and the voice data section from the data to which it restored as well as the time of the usual message, and the speech processing section 16 is especially attained to speech processing section 16 in the voice data section, and the control data section is transmitted to it also to the sound recording playback control section 20 again, respectively at the time of this housesitting sound recording functional set.

[0034] The sound recording playback control section 20 makes the 2nd memory 22 carry out the sequential storage of the voice data (ADPCM voice data) sent from the TDMA section 15 by the time amount length set up beforehand.

[0035] At this time, the communications control section 19 shall perform motion control of the PLL synthesizer 14 and the TDMA section 15 so that it may perform establishment of a message, continuation, and closing in the procedure based on the control program stored in the 1st memory 21 like the time of the above-mentioned usual message.

[0036] The sound recording termination back [ loudspeaker / 17 ], if playback of the voice data memorized through the generalization control section 23 is directed, the sound recording playback control section 20 will read the voice data which the 2nd memory 22 was made to memorize one by one, will send it out to the speech processing section 16, and will carry out a playback output.

[0037] Subsequently, the actuation at the time of downloading the data of the control program of new communication link actuation by the wireless circuit through the base station which is not illustrated is explained. In this case, it gets over through an antenna 11 and a receive section 12, it is recognized by the TDMA section 15 that it is data of a new control program, and the downloaded data are sent out to the sound recording playback control section 20.

[0038] The sound recording playback control section 20 carries out the sequential storage of the sent data of a new control program from the low address position to the 2nd memory 22 which was being used for storage of voice data till then. And when the 2nd memory 22 is made to memorize all the sent data of a new control program, it means completing download of this control program, and the communications control section 19 opens a wireless circuit.

[0039] During activation of the above-mentioned download, the communications control section 19 performs motion control according to the control program of the communication link actuation memorized by the 1st memory 21, when download is completed, it accesses the 2nd memory 22 which memorized a new control program, and it operates according to the control program memorized by this 2nd memory 22 after that.

[0040] When the sound recording playback control section 20 also receives voice data from the TDMA section 15 after that, the 1st memory 21 is made to memorize the voice data in connection with this. Drawing 2 illustrates the concrete circuitry for switching the function of the 1st memory 21 and the 2nd memory 22 by the above-mentioned communications control section 19, and arranges multiplexers 31-34 between the communications control section 19 and the sound recording playback control section 20, the 1st memory 21, and the 2nd memory 22.

[0041] These multiplexers 31-34 interlock, respectively, and multiplexers 31 and 32 and multiplexers 33 and 34 carry out change-over actuation, and carry out change-over actuation of them with the above-mentioned change-over signal by which multiplexers 31 and 32 were reversed with the change-over signal from the direct communication control section 19, and multiplexers 33 and 34 were reversed with the inverter 35.

[0042] A multiplexer 32 However, for the address input to the 1st memory 21 from the communications control section 19 or the sound recording playback control section 20, For the output to the communications control section 19 or the sound recording playback control section 20 of data to which the multiplexer 31 has been read from the 1st memory 21, A multiplexer 33 For the address input to the 2nd memory 22 from the communications control section 19 or the sound recording playback control section 20, It is that from which a multiplexer

34 becomes an output to the communications control section 19 or the sound recording playback control section 20 of data read from the 2nd memory 22. Multiplexers 31 and 32 are connected to the communications control section 19 side all over [ both ] drawing. Both the multiplexers 33 and 34 are connected to the sound recording playback control-section 20 side, and the condition that the control program of the communications control section 19 is memorized by the 1st memory 21, and the voice data of the sound recording playback control section 20 is memorized by the 2nd memory 22 is shown.

[0043] In this case, the change-over signal to multiplexers 31-34 shall be based on the port output of the communications control section 19, makes the 2nd memory 22 memorize the downloaded new control program, and once resets the communications control section 19. It depends for the actuation immediately after the discharge on the control program of the origin memorized by the 1st memory 21. It is working and the version of the control program which is alike, respectively and is memorized by the thing [ accessing the specific address of the 1st memory 21 and the 2nd memory 22 ] is decoded. The contents of the change-over signal to the above-mentioned multiplexers 31-34 shall be determined in order to start the actuation using a new control program. Therefore, processing to which the sound recording playback control section 20 does not write voice data in the above-mentioned specific address of the 1st memory 21 just behind this change-over actuation is needed.

[0044] Thus, the memory for memorizing the memory for memorizing the control program of communication link actuation and the voice data for housesitting sound recording according to the gestalt of implementation of the above 1st is both electrically constituted from rewritable nonvolatile memory. Since it becomes possible from a wireless circuit to download a new control program and mass work-piece memory etc. is not further needed by switching the access root to the memory at the time of download Without increasing a circuit scale by using an unnecessary circuit element, and raising product cost The control program about communication link actuation is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ].

[0045] In addition, although the change-over signal to multiplexers 31-34 was explained as the communications control section 19 outputting as above-mentioned drawing 2 showed, it is good also as what replaces with the communications control section 19 and the generalization control section 23 outputs as shown in drawing 3.

[0046] In this case, if the communications control section 19 notifies having started download of a new control program to the generalization control section 23, while the generalization control section 23 will apply reset to the communications control section 19 at the time of download termination, actuation of the communications control section 19 by the new control program can be made to start immediately by reversing the change-over signal to multiplexers 31-34, and canceling the reset to the communications control section 19.

[0047] (Gestalt of the 2nd operation) This invention is explained with reference to a drawing below about the gestalt of the 2nd operation at the time of applying to the PHS terminal 40 which has a housesitting sound recording function.

[0048] Since drawing 4 is the same as that of what shows the outline configuration and was fundamentally shown by above-mentioned drawing 1, the same sign is given to the same part and the explanation is omitted. However, it replaces with the 1st memory 21 and the 2nd memory 22 in above-mentioned drawing 1. One memory 41 which becomes by rewritable nonvolatile memory electrically is arranged. In this memory 41, shall divide a storage area and the control program and voice data of communication link actuation shall be memorized. Moreover, suppose that all motion control of the writing (at the time of sound recording)/read-out of the voice data to the memory 41 by the control sound recording playback control section 20 in above-mentioned drawing 1 (at the time of playback) is carried out by replacing with the sound recording playback control section 20, and communications control section 19' serving.

[0049] That both control of the communication link actuation which communications control section 19' performs here based on the control program read from memory 41, and the writing / read-out control to the memory 41 of voice data can be performed After making memory 41



memorize the voice data which the control data and voice data in one frame which received in the TDMA section 15 are separated, and must be processed on real time with the frame concerned, before the frame and following frame Since what is necessary is just to perform frame creation of control data which should transmit the received control data to decode and a degree, it is for processing not to overlap in time.

[0050] Drawing 5 shows the processing timing and drawing 5 (1) shows the receiving frame in an input signal. Communications control section 19' makes the area concerned of memory 41 carry out the sequential storage of the voice data separated in the TDMA section 15 as shown in drawing 5 (2) immediately to this receiving frame. And when a receiving frame is completed and it finished memorizing all the separated voice data in memory 41, communications processing, such as creation of control data which transmits the control data separated in the TDMA section 15 with decode and the following transmitting frame, is performed until the next receiving frame period comes so that it may be shown subsequently to drawing 5 (3).

[0051] The above-mentioned memory 41 has taken the configuration of a memory area as shown in drawing 6 . The control program of fundamental communication link actuation which is not influenced by version up etc. in the address area of the head is memorized fixed. With the control program of the fundamental communication link actuation same with the area on the next address space As rewriting of the data containing the jump address mentioned later is enabled, it memorizes and the address space which remains is carried out for 2 minutes, the 1st area and 2nd area are prepared. The control program of the communication link actuation corresponding to [ in these 1st and 2nd area ] the version at that time to one of these will be memorized, and the voice data for a housesitting sound recording function will be memorized by another side.

[0052] Next, actuation of the gestalt of the above-mentioned implementation is explained. However, although it is in this PHS terminal 40, and that explanation is omitted since the actuation at the time of the usual message is the same as that of the case of the gestalt of implementation of the above 1st, communications control section 19' controls communication link actuation according to the control program memorized by either the primary control program memorized by memory 41 or the 1st and 2nd area.

[0053] Moreover, at the time of actuation of a housesitting sound recording function, an antenna 11 and the voice data (ADPCM voice data) separated from the input signal in the TDMA section 15 through the receive section 12 are written in the other side of the 1st and 2nd area of memory 41 one by one by the time amount length to which communications control section 19' is beforehand set as sound recording actuation.

[0054] The sound recording actuation termination back [ loudspeaker / 17 ], if playback of the voice data memorized in memory 41 through the generalization control section 23 is directed, communications control section 19' will read the voice data made to memorize to the other side of the 1st and 2nd area of memory 41 one by one, will send it out to the speech processing section 16, and will carry out a playback output.

[0055] Subsequently, the actuation at the time of downloading the data of the control program of new communication link actuation by the wireless circuit is explained using drawing 7 . In this case, at the initiation time of operation, voice data shall be memorized in the data of the control program of communication link actuation in memory 41, for example, the 1st area, and the 2nd area.

[0056] It gets over through an antenna 11 and a receive section 12, it is recognized by the TDMA section 15 that it is data of a new control program, and the downloaded data are sent out to communications control section 19'.

[0057] Communications control section 19' carries out the sequential storage of the sent data of a new control program from the low address position to the 2nd area of the primary control program memorized by memory 41 and the memory 41 which was being used for storage of voice data till then according to the control program memorized in the 1st area (step S1).

[0058] When all the sent data of a new control program are judged that it made the 2nd area of memory 41 memorize, communications control section 19' And the (step S2), While completing download of this control program and opening a wireless circuit A rewriting setup of the jump address currently held in the area which can rewrite the primary control program memorized by

memory 41 is carried out from the start address of the 1st area at the start address of the 2nd area (step S3).

[0059] Then, communications control section 19' sends out the signal which requires reset from the generalization control section 23 (step S4), and it stands by that a reset signal is sent from the generalization control section 23 corresponding to this signal (step S5).

[0060] And when a reset signal is actually received from the generalization control section 23 Communications control section 19' is reset including various temporary data memorized inside. According to the primary control program of memory 41, and the control program from the start address of the 2nd area corresponding to the jump address which carried out a rewriting setup at the above-mentioned step S3 contained in this primary control program, control of communication link actuation is started anew (step S6). Processing of this drawing 7 is ended above and it shifts to the processing according to the directions from the generalization control section 23.

[0061] When communications control section 19' receives voice data from the TDMA section 15 after that in connection with this at the time of activation of a timed-recording sound function, the 1st area is made to memorize the voice data.

[0062] According to the gestalt of implementation of the above 2nd, thus, by nonvolatile memory rewritable on one electric target Since it constitutes as what shares the memory for memorizing the memory for memorizing the control program of communication link actuation, and the voice data for housesitting sound recording and the memory area location was controlled Though switching elements, such as the multiplexers 31-34 for switching memory as shown with the gestalt of implementation of the above 1st, are eliminated, it becomes possible from a wireless circuit to download a new control program.

[0063] Moreover, the control program about communication link actuation is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ], contributing to the miniaturization of equipment on a scale of a smaller circuit, and still enabling reduction of product cost, since mass work-piece memory etc. is not elsewhere needed at the time of download.

[0064] (Gestalt of the 3rd operation) This invention is explained with reference to a drawing below about the gestalt of the 3rd operation at the time of applying to the PHS terminal 50 which has a housesitting sound recording function.

[0065] Since drawing 8 is the same as that of what shows the outline configuration and was fundamentally shown by above-mentioned drawing 1 , the same sign is given to the same part and the explanation is omitted. A deer is carried out and 1st ROM51 which memorizes the processing algorithm and control program of this speech processing section 16, and 1st RAM52 used as the work area at the time of data processing of this speech processing section 16 are connected to the speech processing section 16.

[0066] Moreover, 2nd ROM53 which memorized each control program, such as wireless management which this communications control section 19 performs, migration management, and preliminary control, and 2nd RAM54 used as the work area at the time of data processing of this communications control section 19 are connected to the communications control section 19.

[0067] Furthermore, 3rd ROM55 which remembers the digitized voice data held to the arrival-of-the-mail response message of housesitting sound recording and the 3rd above RAM 56 after this message to be 3rd RAM56 which holds digitized voice data temporarily at the time of the message of housesitting sound recording is connected to the sound recording playback control section 20.

[0068] And 4th ROM57 which memorized the control program of this generalization control section 23, and 4th RAM58 used as the work area of this generalization control section 23 are connected to the generalization control section 23.

[0069] Next, actuation of the gestalt of the above-mentioned implementation is explained. Here, the actuation at the time of downloading a new control program through the base station which this PHS terminal 50 does not illustrate to either the 1st above ROM 51, 2nd ROM53, 3rd ROM55 and 4th ROM57 is explained.

[0070] Drawing 9 shows the configuration of the data to download and the whole data consists

of a header 101 and data division 102. Among these, the rewriting identifier 103 which shows that it is download for control program rewriting of this data, the length 104 which shows the capacity of the data to download, the ROM number section 105 which shows of which ROM rewriting is performed, and the rewriting starting address section 106 which shows the rewriting starting address of ROM used as the candidate for rewriting are described by the header 101. Moreover, the train of the actually rewritten control program is continuously described by data division 102.

[0071] A deer is carried out, and if it gets over via an antenna 11 and a receive section 12 and the download data from a base station are outputted to the TDMA section 15, the TDMA section 15 will detect the rewriting identifier 103 of the header 101 in the header 101 of data, and will transmit the contents of the header 101 to the communications control section 19. The communications control section 19 which received this transmits the contents of the header 101 to the generalization control section 23 of a high order further.

[0072] The generalization control section 23 performs a store instruction and directions of storing initiation address data so that the output of the TDMA section 15 may be stored in 3rd ROM55 to the sound recording playback control section 20, while performing the root directions to 3rd ROM55 for recognizing download initiation of a control program by the rewriting identifier 103 sent first, and carrying out the temporary storage of the data to download to the communications control section 19.

[0073] In response to the root directions from the generalization control section 23, the communications control section 19 operates the TDMA section 15 so that the data from the TDMA section 15 may be outputted to the sound recording playback control section 20.

[0074] The sound recording playback control section 20 stores the output from the TDMA section 15 in 3rd ROM55 according to the storing starting address directed to the generalization control section 23. Storing in this 3rd ROM55 is continuously performed by the data length shown with length 104, ends download of control data after storing of the data for this data length, and cancels connection with the base station by the antenna 11, the receive section 12, and the TDMA section 15.

[0075] Then, the generalization control section 23 transmits the download data stored in 3rd ROM55 to either 1st ROM51 and 2nd ROM53 which actually rewrite a control program, and 4th ROM57.

[0076] In this case, the generalization control section 23 checks the destination by reading the ROM number section 105 in a header 101, transmits the transport agent subsequently beforehand stored in 4th ROM57 in advance of initiation of a transfer to 4th RAM58, accesses the field of 4th transmitted RAM58, and starts this transport agent. Next, either of speech processing section [ which is connected with ROM for rewriting ] 16, communications control section 19, and generalization control-section 23 selves is made to shift to a transfer receive state. In addition, in response to transfer condition shift directions of the generalization control section 23, a transfer receive state here is transmitted to RAM which has connected the transport agent in ROM which has connected too, and means each control section accessing the field of transmitted RAM, and starting a transfer receiving agent.

[0077] In this way, by both the transport agent of the source and the transport agent of the destination being started, the generalization control section 23 controls the sound recording playback control section 20, and performs the transport agent shown in drawing 10 . That is, the generalization control section 23 sends out the transfer request of the header 101 of the data of the control program downloaded to the sound recording playback control section 20 with reference to the download starting address of 3rd ROM55 (step A1) (step A2).

[0078] Subsequently, when it judges that receiving this header 101 from the sound recording playback control section 20 to this demand stood by and (step A3) received, the part in this header 101 which contains the ROM number section 105 and the rewriting starting address section 106 at least is analyzed (step A4), and the rewriting initiation instruction of ROM linked to the control section of a rewriting place is outputted (step A5).

[0079] Then, when it stands by (step A6) and judges that it was outputted by that the response from the control section of a rewriting place is outputted, that the rewriting starting address

section 106 should be transmitted to the control section of a rewriting place, it sends out (step A7) and the SEND statement of the data division 102 of the next address currently continuously held to the sound recording playback control section 20 at 3rd ROM55 is outputted (step A8).

[0080] And when it judges that reception of the data division 102 sent from data division 102 corresponding to this this SEND statement stood by and (step A9) received, those data division 102 that received are transmitted to the control section of a rewriting place (step A10).

[0081] a \*\*\*\*\* [ that there are data division 102 which should still be transmitted when it stands by (step A11) and judges that it has been sent by that the signal of the completion of reception is sent from the control section of a rewriting place corresponding to this transmission ] — judging (step A12) — being certain — \*\* — when it judges, all the data divisions 102 are transmitted to the control section of a rewriting place by repeating and performing processing from the above-mentioned step A8 again.

[0082] And if it judges that there are already no data division 102 which should be transmitted at the above-mentioned step A12, the signal of transfer termination will be sent out to the control section of a rewriting place (step A13), and activation of the transport agent by this generalization control section 23 will be ended above.

[0083] It comes to perform a transfer receiving agent as shown in drawing 11 with the ROM rewriting instruction received from the generalization control section 23 in above-mentioned step A5 on the other hand in the control section of the rewriting place which receives the data from this generalization control section 23.

[0084] Namely, the control section of a rewriting place answers the above-mentioned ROM rewriting instruction first, and receives the generalization control section 23. After sending out the signal which shows that starting of this transfer receiving agent was completed (step B1), It stands by that the above-mentioned rewriting starting address section 106 is shortly sent from the sound recording playback control section 20 (step B-2). When it judges that this was received, the contents of (step B3) and its rewriting starting address section 106 which received are set as the control address of ROM of a rewriting place (step B4).

[0085] Then, it stands by that the data division 102 which correspond from the generalization control section 23 are transmitted (step B5). When it judged that this was received, after holding (step B6) and its data division 102 which received to RAM which has once connected A write-in setup of the data division 102 which checked that the contents of the data were not the signals which show transfer termination (step B7), and were held to RAM is carried out at ROM of a rewriting place (step B8).

[0086] Subsequently, the signal which shows the completion of reception to the generalization control section 23 is outputted (step B9), and after carrying out a renewal setup of the rewriting address of ROM of "+1", a write-in setup of all the data divisions 102 sent is carried out at ROM by (step B10) and repeating and performing processing from above-mentioned step B5 again.

[0087] And if it judges that the data received at the above-mentioned step B7 are the signal of transfer termination, activation of the transfer receiving agent by this control section will be ended above.

[0088] Drawing 12 indicates the path of the data downloaded in the case of rewriting the contents of 1st ROM51 by the partition by the thick wire. Similarly, drawing 13 indicates the path of the data downloaded in the case of rewriting the contents of 2nd ROM53 by the partition by the thick wire.

[0089] Drawing 14 indicates the path of the data downloaded in the case of rewriting the contents of 4th ROM57 by the partition by the thick wire, and since especially ROM of a rewriting place is 4th ROM57 and the contents of 4th ROM57 to which generalization control-section 23 self which started the transport agent is connected will be rewritten in this case, it becomes unnecessary moreover, to newly start a transfer receiving agent.

[0090] According to the gestalt of implementation of the above 3rd, the memory which constitutes electrically all the memory for memorizing a control program, voice data, etc. in a circuit from rewritable nonvolatile memory, and memorizes voice data by thus, the thing done to maintenance temporarily Since it becomes possible from a wireless circuit to download the new control program for the control sections of arbitration and mass work-piece memory etc. is not

further needed at the time of download Without increasing a circuit scale by using an unnecessary circuit element, and raising product cost The control program about the various actuation in a circuit is downloaded and updated freely, and it becomes upgradable [ for raising the correction and engine performance of the fault of a control program which the producer created ].

[0091] In addition, although each gestalt of the above 1st thru/or the 3rd implementation is illustrated about the case where it applies to a PHS terminal, if it is the pocket communication terminal machine which has the function which this invention is not limited to it, but records voice, and is reproduced, otherwise, of course, it can apply to digital one/analog cellular phone, a specific smallness power transceiver, etc. In addition, let this invention be what has possible deforming variously and carrying out within limits which do not deviate from the summary.

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[Translation done.]

\* NOTICES \*

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

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## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1] The block diagram showing the circuitry concerning the gestalt of operation of the 1st of this invention.

[Drawing 2] The block diagram which illustrates the concrete configuration of change-over connection of the memory concerning the gestalt of this operation.

[Drawing 3] The block diagram which illustrates other concrete configurations of change-over connection of the memory concerning the gestalt of this operation.

[Drawing 4] The block diagram showing the circuitry concerning the gestalt of operation of the 2nd of this invention.

[Drawing 5] The timing chart which shows the contents of the processing of operation concerning the gestalt of this operation

[Drawing 6] Drawing which illustrates the area configuration of the memory of drawing 4 .

[Drawing 7] The flow chart for explaining actuation concerning the gestalt of this operation.

[Drawing 8] The block diagram showing the circuitry concerning the gestalt of operation of the 3rd of this invention.

[Drawing 9] Drawing showing the configuration of the data concerning the gestalt of this operation to download.

[Drawing 10] The flow chart for explaining actuation concerning the gestalt of this operation.

[Drawing 11] The flow chart for explaining actuation concerning the gestalt of this operation.

[Drawing 12] Drawing which illustrates the path of the downloaded data concerning the gestalt of this operation.

[Drawing 13] Drawing which illustrates the path of the downloaded data concerning the gestalt of this operation.

[Drawing 14] Drawing which illustrates the path of the downloaded data concerning the gestalt of this operation.

### [Description of Notations]

10, 40, 50 -- PHS terminal

11 -- Antenna

12 -- Receive section

13 -- Transmitting section

14 -- PLL synthesizer

15 -- The TDMA section

16 -- Speech processing section

17 -- Loudspeaker

18 -- Microphone

19 19' -- Communications control section

20 -- Sound recording playback control section

21 -- The 1st memory

22 -- The 2nd memory

23 -- Generalization control section

31-34 -- Multiplexer

35 -- Inverter  
41 -- Memory  
51 -- The 1st ROM  
52 -- The 1st RAM  
53 -- The 2nd ROM  
54 -- The 2nd RAM  
55 -- The 3rd ROM  
56 -- The 3rd RAM  
57 -- The 4th ROM  
58 -- The 4th RAM  
101 -- Header  
102 -- Data division  
103 -- Rewriting identifier  
104 -- Length  
105 -- ROM number section  
106 -- Rewriting starting address section

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[Translation done.]





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(33) 優先権主張国 日本 (J P)

(71) 出願人 000001443

カシオ計算機株式会社

東京都渋谷区本町1丁目6番2号

(72) 発明者 土田 正彦

東京都羽村市栄町3丁目2番1号 カシオ  
計算機株式会社羽村技術センター内

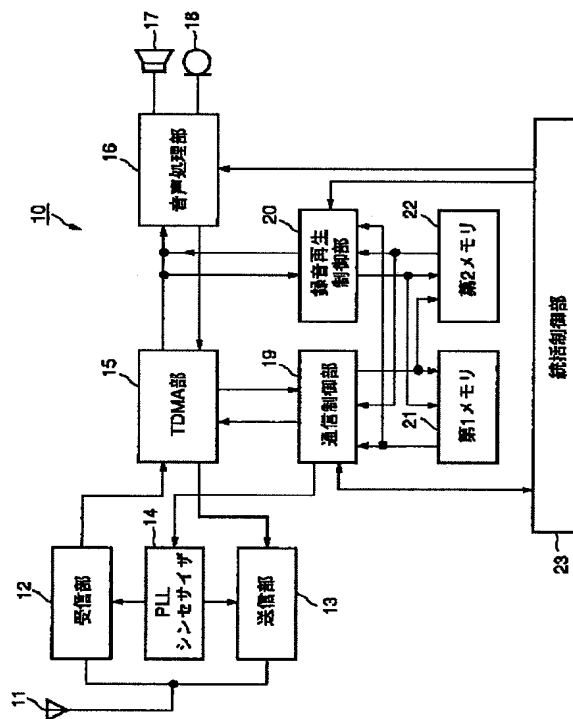
(74) 代理人 弁理士 鈴江 武彦 (外5名)

(54) 【発明の名称】 携帯通信端末機

(57) 【要約】

【課題】録音再生機能を有する携帯通信端末機で、大容量のワークメモリ等を必要とせず、通信動作に関する制御プログラムをダウンロードして更新する。

【解決手段】電氣的書換可能な不揮発性メモリでなる第1メモリ21及び第2メモリ22と、第1メモリ21に記憶させた制御プログラムに従って通信動作の制御を行なう通信制御部19と、第2メモリ22に音声データを記憶させ、これを読み出して再生させる一方、無線回線を通じて新たな制御プログラムを第2メモリ22にダウンロードさせる録音再生制御部20と、通信制御部19、録音再生制御部20と上記メモリ21、22の間に設けられ、第1の状態では通信制御部19を第1メモリ21と、録音再生制御部20を第2メモリ22と切換接続するマルチプレクサ31~34とを備え、上記ダウンロード終了後の第2の状態ではマルチプレクサ31~34により通信制御部19を第2メモリ22と、録音再生制御部20を第1メモリ21と切換接続させる。



## 【特許請求の範囲】

【請求項 1】 通信動作の制御プログラムまたは音声データの一方を記憶する、電氣的に書換可能な不揮発性メモリでなる第 1 のメモリと、

上記制御プログラムまたは音声データの他方を記憶する、電氣的に書換可能な不揮発性メモリでなる第 2 のメモリと、

上記第 1 または第 2 のメモリに記憶されている制御プログラムに従って通信動作の制御を行なう通信制御手段と、

上記第 2 または第 1 のメモリに音声データを記憶させ、これを読み出して再生させる一方、無線回線を通じて得た新たな制御プログラムを上記音声データを記憶する上記第 2 または第 1 のメモリにダウンロードさせる録音再生制御手段と、

上記通信制御手段と上記第 1 及び第 2 のメモリの間、及び上記録音再生制御手段と上記第 2 及び第 1 のメモリの間に設けられ、上記通信制御手段を上記制御プログラムを記憶している上記第 1 または第 2 のメモリと、上記録音再生制御手段を上記音声データを記憶する上記第 2 または第 1 のメモリと切替接続する切替接続手段と、

上記ダウンロード終了後には上記切替接続手段により上記通信制御手段をそれまで音声データを記憶していた、新たにダウンロードした制御プログラムを記憶した上記第 2 または第 1 のメモリと切替接続させると共に、上記録音再生制御手段をそれまでは制御プログラムを記憶していた上記第 1 または第 2 のメモリと切替接続させる切替制御手段とを具備したことを特徴とする携帯通信端末機。

【請求項 2】 通信動作の制御プログラム及びデータをエリアを分けて記憶する、電氣的に書換可能な不揮発性メモリでなるメモリと、

上記メモリに記憶されている制御プログラムに従って端末機動作の制御を行なう制御手段と、

無線回線を通じて新たな制御プログラムを得た際には上記メモリのそれまでデータを記憶していたエリアにダウンロードさせるダウンロード手段と、

上記ダウンロード終了後には上記制御手段に対し、上記メモリの新たに制御データをダウンロードしたエリアのアドレス指定を行なう一方、上記メモリのそれまで使用していた制御プログラムを記憶したエリアにデータを記憶させるようにアドレス指定を行うエリア切替手段とを具備したことを特徴とする携帯通信端末機。

【請求項 3】 それぞれ通信動作の制御プログラムを記憶する、電氣的に書換可能な不揮発性メモリでなる第 1 のメモリ群と、

音声データを記憶する、電氣的に書換可能な不揮発性メモリでなる第 2 のメモリと、

それぞれ上記第 1 のメモリ群のうちの対応する 1 つに記憶されている制御プログラムに従って通信動作の制御を

行なう複数の制御手段と、

上記第 2 のメモリに音声データを記憶させ、これを読み出して再生させる一方、無線回線を通じて得た新たな制御プログラムを上記第 2 のメモリにダウンロードさせる録音再生制御手段とを具備し、上記複数の制御手段のうちの 1 つは、上記ダウンロード終了後に、上記第 2 のメモリにダウンロードされた制御プログラムを上記第 1 のメモリ群中の対応する 1 つに更新記憶させることを特徴とする携帯通信端末機。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、音声を録音し再生する機能を有する、例えば PHS 端末機や特定小電力トランシーバ等の携帯通信端末機に関する。

## 【0002】

【従来の技術】現在一般的に使用されている例えば PHS 端末機やデジタル携帯電話、特定小電力トランシーバ等の携帯通信端末機では、通信動作に必要な制御プログラムが半導体メモリに固定的に記憶されている。この場合、半導体メモリとして使用されているのは、具体的には EPROM、フラッシュ ROM、EEPROM、マスク ROM、強誘電体 RAM 等のいずれも不揮発性メモリが、電源バックアップの必要がなく、したがって電力を無駄に消費することがないものとして使用されている。

【0003】しかるに、上記列挙した不揮発性メモリのうちで、記憶内容を電氣的に書換可能なものは、フラッシュ ROM、EEPROM、強誘電体 RAM であり、これら電氣的に書換可能な不揮発性メモリを使用した場合には、バージョンアップ等で通信動作に関する制御プログラムを例えば無線データの送受により更新することも可能であると考えられる。

## 【0004】

【発明が解決しようとする課題】しかしながら、制御プログラムを電氣的に書換可能な不揮発性メモリに記憶させているもので、実際にバージョンアップ等で通信動作に関する制御プログラムを無線データの送受によりダウンロードして更新する場合には、通常の通信動作では必要ない位の大容量のワークメモリが必要となり、このような大容量のワークメモリをバージョンアップ等を行なうために予め備えておくことはコストの面で非常に不利であり、携帯通信端末機自体の価格にも影響してしまうこととなる。

【0005】また、携帯通信端末機をサービスセンタに持込めば、不揮発性メモリが電氣的に書換可能なものではなくても、不揮発性メモリそのものを交換するか、あるいは、記憶内容を書換えることにより、制御プログラムを更新させることも可能である。

【0006】しかしながら、その場合には端末機をサービスセンタへ持込むための手間と相当の期間が必要となり、その間は端末機を使用することができないので、気

軽に制御プログラムの更新を実施するというわけにはいなくなる。

【0007】ところで、PHS端末機やデジタル携帯電話等の携帯通信端末機では、録音再生機能を有し、着信に対応できない状態での発呼者からの用件をデジタルデータ化して記憶させておき、後の任意時点でその記憶内容を再生することで用件を確認することができるものがある。この種の録音再生機能で記憶媒体として使用されているのは、やはりフラッシュROM、EEPROM、強誘電体RAMなどの不揮発性メモリである。

【0008】したがって、録音再生機能を有する携帯通信端末機では、同種の不揮発性メモリを制御プログラムの記憶用とデジタル音声データの記憶用の2つの用途でそれぞれ使用していることになるが、これらは回路内で互いに用途を限って使用しており、他の用途のために使用されることはない。

【0009】本発明は上記のような実情に鑑みてなされたもので、その目的とするところは、録音再生機能を有する携帯通信端末機で、制御プログラムの記憶用とデジタル音声データの記憶用の2つの用途で使用される同種の不揮発性メモリを有効に活用し、大容量のワークメモリ等を必要とせず、気軽に通信動作に関する制御プログラムをダウンロードして更新することが可能な携帯通信端末機を提供することにある。

【0010】

【課題を解決するための手段発明が解決しようとする課題】請求項1記載の発明は、通信動作の制御プログラムまたは音声データの一方を記憶する、電氣的に書換可能な不揮発性メモリでなる第1のメモリと、上記制御プログラムまたは音声データの他方を記憶する、電氣的に書換可能な不揮発性メモリでなる第2のメモリと、上記第1または第2のメモリに記憶されている制御プログラムに従って通信動作の制御を行なう通信制御手段と、上記第2または第1のメモリに音声データを記憶させ、これを読み出して再生させる一方、無線回線を通じて新たな制御プログラムを上記音声データを記憶する上記第2または第1のメモリにダウンロードさせる録音再生制御手段と、上記通信制御手段と上記第1及び第2のメモリの間、及び上記録音再生制御手段と上記第2及び第1のメモリの間に設けられ、上記通信制御手段を上記制御プログラムを記憶している上記第1または第2のメモリと、上記録音再生制御手段を上記音声データを記憶する上記第2または第1のメモリと切換接続する切換接続手段と、上記ダウンロード終了後には上記切換接続手段により上記通信制御手段をそれまで音声データを記憶していた、新たにダウンロードした制御プログラムを記憶した上記第2または第1のメモリと切換接続させると共に、上記録音再生制御手段をそれまでは制御プログラムを記憶していた上記第1または第2のメモリと切換接続させる切換制御手段とを具備したことを特徴とする。

【0011】このような構成とすれば、通信動作の制御プログラムを記憶するためのメモリと留守番録音用の音声データを記憶するためのメモリを共に電氣的に書換可能な不揮発性メモリで構成し、そのメモリへのアクセスルートを切換えることで、無線回線から新たな制御プログラムをダウンロードすることが可能となり、さらにダウンロード時に大容量のワークメモリ等を必要としないので、無用な回路素子を用いることで回路規模を増大し、且つ製品コストを上昇させてしまうことなく、気軽に通信動作に関する制御プログラムをダウンロードして更新し、生産者の作成した制御プログラムの不具合の修正や性能を向上させるためのバージョンアップを行なうことが可能となる。

【0012】請求項2記載の発明は、通信動作の制御プログラム及びデータをエリアを分けて記憶する、電氣的に書換可能な不揮発性メモリでなるメモリと、上記メモリに記憶されている制御プログラムに従って端末機動作の制御を行なう制御手段と、無線回線を通じて新たな制御プログラムを得た際には上記メモリのそれまでデータを記憶していたエリアにダウンロードさせるダウンロード手段と、上記ダウンロード終了後に上記制御手段に対し、上記メモリの新たに制御データをダウンロードしたエリアのアドレス指定を行なう一方、上記メモリのそれまで使用していた制御プログラムを記憶したエリアにデータを記憶させるようにアドレス指定を行うエリア切替手段とを具備したことを特徴とする。

【0013】このような構成とすれば、1つの電氣的に書換可能な不揮発性メモリで、通信動作の制御プログラムを記憶するためのメモリと留守番録音用の音声データを記憶するためのメモリを共用するものとして構成し、そのメモリ内のエリア位置を制御するようにしたので、複数のメモリを切換えるためのスイッチング素子を排除しながらも、無線回線から新たな制御プログラムをダウンロードすることが可能となり、さらにダウンロード時に他に大容量のワークメモリ等を必要としないので、より小さな回路規模で装置の小型化に寄与し、さらに製品コストを低減可能としつつ、気軽に通信動作に関する制御プログラムをダウンロードして更新し、生産者の作成した制御プログラムの不具合の修正や性能を向上させるためのバージョンアップが可能となる。

【0014】請求項3記載の発明は、それぞれ通信動作の制御プログラムを記憶する、電氣的に書換可能な不揮発性メモリでなる第1のメモリ群と、音声データを記憶する、電氣的に書換可能な不揮発性メモリでなる第2のメモリと、それぞれ上記第1のメモリ群のうちの対応する1つに記憶されている制御プログラムに従って通信動作の制御を行なう複数の制御手段と、上記第2のメモリに音声データを記憶させ、これを読み出して再生させる一方、無線回線を通じて得た新たな制御プログラムを上記第2のメモリにダウンロードさせる録音再生制御手段と

を具備し、上記複数の制御手段のうちの1つは、上記ダウンロード終了後に、上記第2のメモリにダウンロードされた制御プログラムを上記第1のメモリ群中の対応する1つに更新記憶させることを特徴とする。

【0015】このような構成とすれば、回路内の制御プログラムや音声データ等を記憶するためのメモリをすべて電氣的に書換可能な不揮発性メモリで構成し、音声データを記憶するメモリを一時保持用とすることで、無線回線から任意の制御部用の新たな制御プログラムをダウンロードすることが可能となり、さらにダウンロード時に大容量のワークメモリ等を必要としないので、無用な回路素子を用いることで回路規模を増大し、且つ製品コストを上昇させてしまうことなく、気軽に回路内の各種動作に関する制御プログラムをダウンロードして更新し、生産者の作成した制御プログラムの不具合の修正や性能を向上させるためのバージョンアップが可能となる。

【0016】

【発明の実施の形態】

(第1の実施の形態) 以下本発明を留守番録音機能を有するPHS端末機10に適用した場合の第1の実施の形態について図面を参照して説明する。

【0017】図1はその概略構成を示すものである。図中、11はアンテナで、このアンテナ11には送信/受信を振り分ける図示しないアンテナスイッチを介して受信部12及び送信部13を接続している。これら受信部12及び送信部13は、周波数変換部と復調部または変調部で構成されるもので、受信部12では、アンテナ11から入力された信号が上記アンテナスイッチを介して入力され、PLLシンセサイザ14から出力される所定周波数の局部発振信号と混合することにより、1.9GHz帯から1MHz付近のIF信号に周波数変換し、復調部にてこのIF信号を復調してIQデータに分離し、データ列にして次段のTDMA(Time Division Multiple Access: 時分割多元接続)部15に転送するようにしている。

【0018】一方、送信部13では、TDMA部15から転送されてきたデータからIQデータを生成し、これを変調部にて $\pi/4$ シフトQPSKの変調波とした後に上記PLLシンセサイザ14から出力される所定周波数の局部発振信号と混合することにより1.9GHz帯に周波数変換し、上記アンテナスイッチを介してアンテナ11より輻射するようにしている。

【0019】TDMA部15は、フレーム同期及びスロットのデータフォーマット処理を行なうもので、受信側では、受信部12内の変調部から送られてくる受信データから所定タイミングで1スロット分のデータを取出し、このデータの中からユニークワード(同期信号)を抽出してフレーム同期をとり、且つ制御データ部及び音声データ部のスクランブルなどを解除した後、制御データ

は後述する通信制御部19に送り、音声データは音声処理部16及び録音再生制御部20に転送する。

【0020】一方、TDMA部15の送信側では、音声処理部16から送られてくる音声データに制御データなどを付加し、スクランブルなどをかけた後にユニークワードなどを付加して1スロット分の送信データを作成し、所定タイミングでフレーム内の所定スロットに挿入して上記送信部13内の変調部に送出する。

【0021】音声処理部16は、スピーチコーデック部及びPCMコーデック部により構成され、後述する統括制御部23からの制御を受けて動作するもので、スピーチコーデック部は、デジタルデータの圧縮/伸長処理を行なうもので、受信側では、TDMA部15または録音再生制御部20から送られてきたADPCM音声データ(4ビット×8kHz=32Kbps)をPCM音声データ(8ビット×8kHz=64Kbps)に復号化することにより伸長してPCMコーデック部に出力する。一方、スピーチコーデック部の送信側では、PCMコーデック部から送られてきたPCM音声データをADPCM音声データに符号化することにより圧縮して上記TDMA部15に出力する。

【0022】また、音声処理部16のPCMコーデック部は、アナログ/デジタル変換処理を行なうもので、その受信側では、スピーチコーデック部から送られてくるPCM音声データをD/A変換してアナログ音声信号を受話器を構成するスピーカ17に出力し、一方、送信側では、送話器を構成するマイクロフォン18から入力されたアナログ音声信号をA/D変換し、そのPCM音声データを上記スピーチコーデック部に出力する。

【0023】通信制御部19は、後述する第1メモリ21及び第2メモリ22のいずれか一方に格納されている制御プログラムに基づき、統括制御部23からの制御を適宜受けながら上記PLLシンセサイザ14及びTDMA部15における通信動作の制御を司る。

【0024】録音再生制御部20は、統括制御部23の制御の下に留守番録音/再生動作の制御を行なうもので、TDMA部15から送られてくるADPCM音声データを第1メモリ21及び第2メモリ22のいずれか一方に記憶させ、またこの第1メモリ21及び第2メモリ22のいずれか他方に記憶させたADPCM音声データを読出して音声処理部16へ送出する。

【0025】上記第1メモリ21及び第2メモリ22は、共にフラッシュROM、EEPROM、強誘電体RAMなどの電氣的な書換可能な不揮発性メモリにより構成されるもので、その一方で上記通信制御部19の制御プログラムを記憶し、他方で録音再生制御部20の制御に基づいたADPCM音声データを記憶することとなる。

【0026】統括制御部23は、このPHS端末機10の使用者の操作に対応してこの回路全体を統括制御する

と共にマンマシンインターフェイスを兼ねたものであり、特に上記録音再生制御部 2 0 及び音声処理部 1 6 に対して制御指令を送出すると共に、上記通信制御部 1 9 と制御データの送受を行なう。

【0027】次に上記実施の形態の動作について説明する。通常の通話時において、図示しない基地局からの電波はアンテナ 1 1 を経由して受信部 1 2 に入力され、この受信部 1 2 で復調してベースバンドの I Q データ列にして TDMA 部 1 5 に転送する。

【0028】TDMA 部 1 5 では、復調したデータから制御データ部及び音声データ部に分離し、制御データ部を音声処理部 1 6 へ、音声データ部を音声処理部 1 6 へそれぞれ転送する。

【0029】音声データ部を受けた音声処理部 1 6 では、デジタル値の音声データをアナログの信号に変換してスピーカ 1 7 に出力し、このスピーカ 1 7 より放音させる。一方、マイクロフォン 1 8 で入力した音声は音声処理部 1 6 がデジタルデータ化した後に TDMA 部 1 5 に送出する。TDMA 部 1 5 では、この音声データに通信制御部 1 9 から与えられる制御データを付加して所定の送信フォーマットに従ったスロット単位の送信データを作成し、所定タイミングでフレーム内の所定スロットに挿入して送信部 1 3 に送出する。

【0030】送信部 1 3 は、TDMA 部 1 5 から転送されてきたデータを変調した後に周波数変換し、アンテナ 1 1 より輻射して上記図示しない基地局に送出するようにしている。

【0031】このような通話中、通信制御部 1 9 は例えば第 1 メモリ 2 1 に格納されている制御プログラムに基づいた手順で通話の確立、継続、終了を行なうべく PLL センササイザ 1 4 及び TDMA 部 1 5 の動作制御を行なうものとする。

【0032】次に、留守番録音機能をセットしている状態での録音動作について説明する。留守番録音機能をセットしている状態で着信があった場合、図示しない基地局からの電波はアンテナ 1 1 を経由して受信部 1 2 に入力され、この受信部 1 2 で復調してベースバンドの I Q データ列にして TDMA 部 1 5 に転送する。

【0033】TDMA 部 1 5 では、通常の通話時と同じく、復調したデータから制御データ部及び音声データ部に分離するもので、制御データ部を音声処理部 1 6 へ、また音声データ部を音声処理部 1 6 及び特にこの留守番録音機能セット時には録音再生制御部 2 0 へもそれぞれ転送する。

【0034】録音再生制御部 2 0 は、TDMA 部 1 5 から送られてくる音声データ (ADPCM 音声データ) を予め設定されている時間長分だけ第 2 メモリ 2 2 に順次記憶させる。

【0035】このとき、通信制御部 1 9 は上記通常の通話時と同様に第 1 メモリ 2 1 に格納されている制御プロ

グラムに基づいた手順で通話の確立、継続、終了を行なうべく PLL センササイザ 1 4 及び TDMA 部 1 5 の動作制御を行なうものとする。

【0036】録音終了後、統括制御部 2 3 を介して記憶した音声データの再生が指示されると、録音再生制御部 2 0 は第 2 メモリ 2 2 に記憶させた音声データを順次読出して音声処理部 1 6 に送出し、スピーカ 1 7 より再生出力させるものである。

【0037】次いで、図示しない基地局を介して無線回線により新たな通信動作の制御プログラムのデータをダウンロードする際の動作について説明する。この場合、ダウンロードしたデータはアンテナ 1 1、受信部 1 2 を経て復調され、TDMA 部 1 5 により新たな制御プログラムのデータであることが認識され、録音再生制御部 2 0 へ送出される。

【0038】録音再生制御部 2 0 は、それまで音声データの記憶に使用していた第 2 メモリ 2 2 に対し、送られてきた新たな制御プログラムのデータを低いアドレス位置から順次記憶させていく。そして、送られてきた新たな制御プログラムのデータをすべて第 2 メモリ 2 2 に記憶させた時点で該制御プログラムのダウンロードを完了したこととなり、通信制御部 1 9 は無線回線を開放する。

【0039】上記ダウンロードの実行中、通信制御部 1 9 は第 1 メモリ 2 1 に記憶されている通信動作の制御プログラムに従って動作制御を行ない、ダウンロードが終了した時点で新たな制御プログラムを記憶した第 2 メモリ 2 2 をアクセスし、以後この第 2 メモリ 2 2 に記憶されている制御プログラムに従って動作する。

【0040】これに伴ない、録音再生制御部 2 0 も以後 TDMA 部 1 5 から音声データを受けた場合にはその音声データを第 1 メモリ 2 1 に記憶させることとなる。図 2 は上記通信制御部 1 9 により第 1 メモリ 2 1、第 2 メモリ 2 2 の機能を切替えるための具体的な回路構成を例示するもので、通信制御部 1 9 及び録音再生制御部 2 0 と第 1 メモリ 2 1 及び第 2 メモリ 2 2 との間にマルチプレクサ 3 1 ~ 3 4 を配設したものである。

【0041】これらマルチプレクサ 3 1 ~ 3 4 は、マルチプレクサ 3 1 と 3 2、マルチプレクサ 3 3 と 3 4 がそれぞれ連動して切換動作するもので、マルチプレクサ 3 1、3 2 は直接通信制御部 1 9 からの切換信号により、マルチプレクサ 3 3、3 4 はインバータ 3 5 により反転された上記切換信号により切換動作する。

【0042】しかるに、マルチプレクサ 3 2 が通信制御部 1 9 または録音再生制御部 2 0 からの第 1 メモリ 2 1 へのアドレス入力用、マルチプレクサ 3 1 が第 1 メモリ 2 1 から読出されてきたデータの通信制御部 1 9 または録音再生制御部 2 0 への出力用、マルチプレクサ 3 3 が通信制御部 1 9 または録音再生制御部 2 0 からの第 2 メモリ 2 2 へのアドレス入力用、マルチプレクサ 3 4 が第

2メモリ22から読出されてきたデータの通信制御部19または録音再生制御部20への出力用となるもので、図中ではマルチプレクサ31, 32が共に通信制御部19側に接続され、マルチプレクサ33, 34が共に録音再生制御部20側に接続されて、第1メモリ21に通信制御部19の制御プログラムが、第2メモリ22に録音再生制御部20の音声データが記憶される状態を示している。

【0043】この場合、マルチプレクサ31～34への切換信号は通信制御部19のポート出力によるものとしており、ダウンロードした新たな制御プログラムを第2メモリ22に記憶させ、一旦通信制御部19をリセットして、その解除直後の動作を第1メモリ21に記憶されている元の制御プログラムに依存して、その動作中で第1メモリ21と第2メモリ22の特定アドレスをアクセスすることでそれぞれに記憶されている制御プログラムのバージョンを解読し、新たな制御プログラムを用いた動作を開始するべく上記マルチプレクサ31～34への切換信号の内容を決定するものとする。したがって、録音再生制御部20はこの切換動作直後に第1メモリ21の上記特定アドレスには音声データの書込みを行なわなければならないような処理が必要となる。

【0044】このように上記第1の実施の形態によれば、通信動作の制御プログラムを記憶するためのメモリと留守番録音用の音声データを記憶するためのメモリを共に電気的に書換可能な不揮発性メモリで構成し、そのメモリへのアクセスルートを切換えることで、無線回線から新たな制御プログラムをダウンロードすることが可能となり、さらにダウンロード時に大容量のワークメモリ等を必要としないので、無用な回路素子を用いることで回路規模を増大し、且つ製品コストを上昇させてしまうことなく、気軽に通信動作に関する制御プログラムをダウンロードして更新し、生産者の作成した制御プログラムの不具合の修正や性能を向上させるためのバージョンアップが可能となる。

【0045】なお、上記図2で示した如くマルチプレクサ31～34への切換信号は通信制御部19が出力することとして説明したが、図3に示すように通信制御部19に代えて統括制御部23が出力するものとしてもよい。

【0046】この場合、通信制御部19が新たな制御プログラムのダウンロードを開始したことを統括制御部23に通知すると、統括制御部23はダウンロード終了時に通信制御部19に対してリセットをかけると同時に、マルチプレクサ31～34への切換信号を反転させ、それから通信制御部19へのリセットを解除することで、直ちに新たな制御プログラムによる通信制御部19の動作を開始させることができるようになる。

【0047】(第2の実施の形態)次に本発明を留守番録音機能を有するPHS端末機40に適用した場合の第

2の実施の形態について図面を参照して説明する。

【0048】図4はその概略構成を示すもので、基本的には上記図1で示したものと同様であるので、同一部分には同一符号を付してその説明は省略する。しかるに、上記図1における第1メモリ21及び第2メモリ22に代えて、電気的に書換可能な不揮発性メモリでなる1つのメモリ41を配設し、このメモリ41に通信動作の制御プログラムと音声データを記憶エリアを分けて記憶するものとし、また上記図1における制御録音再生制御部20によるメモリ41への音声データの書込み(録音時)/読出し(再生時)の動作制御は全て録音再生制御部20に代えて通信制御部19'が兼ねて行なうこととする。

【0049】ここで、通信制御部19'がメモリ41から読出した制御プログラムに基づいて行なう通信動作の制御と音声データのメモリ41への書込み/読出し制御を共に実行できるのは、TDMA部15にて受信した1フレーム中の制御データと音声データとが分離され、当該フレームでリアルタイムに処理しなければならない音声データをメモリ41に記憶させた後、そのフレームと次のフレームまでの間に、受信した制御データを解読と次に送信すべき制御データのフレーム作成とを行なえばよいので、処理が時間的に重複しないためである。

【0050】図5はその処理タイミングを示すものであり、図5(1)は受信信号中の受信フレームを示す。この受信フレームに対して、図5(2)に示すようにTDMA部15で分離された音声データを即座に通信制御部19'がメモリ41の当該エリアに順次記憶させる。そして、受信フレームが終了し、分離した音声データをすべてメモリ41に記憶し終えた時点で、次いで図5

(3)に示すように次の受信フレーム期間となるまでTDMA部15で分離した制御データを解読、次の送信フレームで送信する制御データの作成等の通信処理を行なうものである。

【0051】上記メモリ41は図6に示すようなメモリエリアの構成をとっており、その先頭のアドレスエリアにバージョンアップ等に影響されない基本的な通信動作の制御プログラムが固定的に記憶され、次のアドレス空間上のエリアに同じく基本的な通信動作の制御プログラムながら、後述するジャンプアドレスを含むデータが書換え可能にして記憶され、残るアドレス空間を2分するようにして、第1のエリアと第2のエリアとが設けられる。これら第1及び第2のエリアは、その一方にそのときのバージョンに対応した通信動作の制御プログラムが記憶され、他方に留守番録音機能用の音声データが記憶されることとなる。

【0052】次に上記実施の形態の動作について説明する。しかるに、このPHS端末機40にあって、通常の通話時の動作は上記第1の実施の形態の場合と同様であるのでその説明は省略するが、通信制御部19'はメモ

リ 4 1 に記憶されている基本制御プログラム及び第 1 及び第 2 のエリアの一方に記憶されている制御プログラムに従って通信動作を制御する。

【0053】また、留守番録音機能の動作時には、アンテナ 1 1、受信部 1 2 を介して TDMA 部 1 5 で受信信号から分離した音声データ (ADPCM 音声データ) を通信制御部 1 9' が録音動作として予め設定されている時間長分だけメモリ 4 1 の第 1 及び第 2 のエリアの他方側に順次書込む。

【0054】録音動作終了後、統括制御部 2 3 を介してメモリ 4 1 に記憶した音声データの再生が指示されると、通信制御部 1 9' はメモリ 4 1 の第 1 及び第 2 のエリアの他方側に記憶させた音声データを順次読出して音声処理部 1 6 に送出し、スピーカ 1 7 より再生出力させるものである。

【0055】次いで、無線回線により新たな通信動作の制御プログラムのデータをダウンロードする際の動作について図 7 を用いて説明する。この場合、動作開始時点では、メモリ 4 1 の例えば第 1 のエリアに通信動作の制御プログラムのデータか、第 2 のエリアに音声データが記憶されているものとする。

【0056】ダウンロードしたデータはアンテナ 1 1、受信部 1 2 を経て復調され、TDMA 部 1 5 により新たな制御プログラムのデータであることが認識され、通信制御部 1 9' へ送出される。

【0057】通信制御部 1 9' は、メモリ 4 1 に記憶されている基本制御プログラム及び例えば第 1 のエリアに記憶されている制御プログラムに従い、それまで音声データの記憶に使用していたメモリ 4 1 の第 2 のエリアに対し、送られてきた新たな制御プログラムのデータを低いアドレス位置から順次記憶させていく (ステップ S 1)。

【0058】そして、送られてきた新たな制御プログラムのデータをすべてメモリ 4 1 の第 2 のエリアに記憶させたと判断した時点で通信制御部 1 9' は (ステップ S 2)、該制御プログラムのダウンロードを完了したものとし、無線回線を開放すると共に、メモリ 4 1 に記憶されている基本制御プログラムの書換可能なエリアに保持されているジャンプアドレスを第 1 のエリアの先頭アドレスから第 2 のエリアの先頭アドレスに書換設定する (ステップ S 3)。

【0059】その後、通信制御部 1 9' は統括制御部 2 3 に対してリセットを要求する信号を送出し (ステップ S 4)、この信号に対応して統括制御部 2 3 からリセット信号が送られてくるのを待機する (ステップ S 5)。

【0060】そして、統括制御部 2 3 から実際にリセット信号を受信した時点で、通信制御部 1 9' は内部に記憶している一時的な各種データ等を含めてリセットし、改めてメモリ 4 1 の基本制御プログラム、及びこの基本制御プログラム中に含まれる上記ステップ S 3 で書換設

定したジャンプアドレスに対応した第 2 のエリアの先頭アドレスからの制御プログラムに従って通信動作の制御を起動し (ステップ S 6)、以上でこの図 7 の処理を終了して、統括制御部 2 3 からの指示に応じた処理に移行する。

【0061】これに伴ない、通信制御部 1 9' は以後留守番録音機能の実行時に TDMA 部 1 5 から音声データを受けた場合には、その音声データを第 1 のエリアに記憶させることとなる。

【0062】このように上記第 2 の実施の形態によれば、1 つの電氣的に書換可能な不揮発性メモリで、通信動作の制御プログラムを記憶するためのメモリと留守番録音用の音声データを記憶するためのメモリを共用するものとして構成し、そのメモリエリア位置を制御するようにしたので、上記第 1 の実施の形態で示したようなメモリを切替えるためのマルチプレクサ 3 1 ~ 3 4 などのスイッチング素子を排除しながらも、無線回線から新たな制御プログラムをダウンロードすることが可能となる。

【0063】また、ダウンロード時に他に大容量のワークメモリ等を必要としないので、より小さな回路規模で装置の小型化に寄与し、さらに製品コストを低減可能としつつ、気軽に通信動作に関する制御プログラムをダウンロードして更新し、生産者の作成した制御プログラムの不具合の修正や性能を向上させるためのバージョンアップが可能となる。

【0064】(第 3 の実施の形態) 次に本発明を留守番録音機能を有する PHS 端末機 5 0 に適用した場合の第 3 の実施の形態について図面を参照して説明する。

【0065】図 8 はその概略構成を示すもので、基本的には上記図 1 で示したものと同様であるので、同一部分には同一符号を付してその説明は省略する。しかし、音声処理部 1 6 に対して、この音声処理部 1 6 の処理アルゴリズムや制御プログラムを記憶する第 1 ROM 5 1 と、この音声処理部 1 6 のデータ処理時のワークエリアとなる第 1 RAM 5 2 が接続される。

【0066】また、通信制御部 1 9 に対して、この通信制御部 1 9 の行なう無線管理、移動管理、予備制御等の各制御プログラムを記憶した第 2 ROM 5 3 と、この通信制御部 1 9 のデータ処理時のワークエリアとなる第 2 RAM 5 4 が接続される。

【0067】さらに、録音再生制御部 2 0 に対して、留守番録音の通話時にデジタル音声データを一時保持する第 3 RAM 5 6 と、留守番録音の着信応答メッセージ及び該通話後の上記第 3 RAM 5 6 に保持したデジタル音声データを記憶する第 3 ROM 5 5 が接続される。

【0068】そして、統括制御部 2 3 に対して、この統括制御部 2 3 の制御プログラムを記憶した第 4 ROM 5 7 と、この統括制御部 2 3 のワークエリアとなる第 4 RAM 5 8 が接続される。

【0069】次に上記実施の形態の動作について説明する。ここでは、このPHS端末機50が図示しない基地局を介して上記第1ROM51、第2ROM53、第3ROM55、及び第4ROM57のいずれかへ新たな制御プログラムをダウンロードする際の動作について説明する。

【0070】図9はダウンロードするデータの構成を示すもので、データ全体はヘッダー部101とデータ部102とで構成される。このうちヘッダー部101には、このデータが制御プログラム書換えのためのダウンロードであることを示す書換識別子103、ダウンロードするデータの容量を示すレングス104、どのROMの書換えを行なうのかを示すROM番号部105、及び書換対象となるROMの書換開始アドレスを示す書換開始アドレス部106が記述されている。また、データ部102には、実際に書換える制御プログラムの列が連続して記述される。

【0071】しかして、基地局からのダウンロードデータをアンテナ11、受信部12を経由して復調し、TDMA部15に出力すると、TDMA部15はデータのヘッダー部101中のヘッダー部101の書換識別子103を検出し、通信制御部19に対してヘッダー部101の内容を伝送する。これを受けた通信制御部19は、さらに上位の統括制御部23に対してヘッダー部101の内容を伝送する。

【0072】統括制御部23は、まず送られてきた書換識別子103により制御プログラムのダウンロード開始を認識し、ダウンロードするデータを一時格納させるための第3ROM55へのルート指示を通信制御部19に対して行なうと共に、録音再生制御部20へTDMA部15の出力を第3ROM55に格納するように格納命令と格納開始アドレスデータの指示を行なう。

【0073】通信制御部19は、統括制御部23からのルート指示を受けて、TDMA部15からのデータが録音再生制御部20へ出力されるようにTDMA部15を操作する。

【0074】録音再生制御部20は、統括制御部23に指示された格納開始アドレスに従ってTDMA部15からの出力を第3ROM55に格納していく。この第3ROM55への格納はレングス104で示されるデータ長分だけ連続して行われるもので、該データ長分のデータの格納後に制御データのダウンロードを終了し、アンテナ11、受信部12、及びTDMA部15による基地局との接続を解除する。

【0075】その後、統括制御部23は第3ROM55に格納したダウンロードデータを、実際に制御プログラムの書換えを行なう、第1ROM51、第2ROM53、及び第4ROM57のいずれかに対して転送する。

【0076】この場合、統括制御部23はヘッダー部101中のROM番号部105を読出すことで転送先を確

認し、次いで転送の開始に先立って第4ROM57に予め格納されている転送プログラムを第4RAM58に転送し、転送した第4RAM58の領域をアクセスして該転送プログラムを起動する。次に、書換対象のROMと接続されている音声処理部16、通信制御部19、及び統括制御部23自身のいずれかを転送受信状態に移行させる。なお、ここでいう転送受信状態とは、統括制御部23の転送状態移行指示を受けて、接続しているROM内の転送プログラムを、やはり接続しているRAMに転送し、転送したRAMの領域を各制御部がアクセスして転送受信プログラムを起動することをいう。

【0077】こうして転送元の転送プログラムと転送先の転送プログラムとが共に起動されることで、統括制御部23は録音再生制御部20を制御し、図10に示す転送プログラムを実行する。すなわち、統括制御部23は第3ROM55のダウンロード開始アドレスを参照し（ステップA1）、録音再生制御部20に対してダウンロードした制御プログラムのデータのヘッダー部101の転送要求を送出する（ステップA2）。

【0078】次いで、この要求に対して該ヘッダー部101を録音再生制御部20から受信するのを待機し（ステップA3）、受信したと判断した時点で該ヘッダー部101中の少なくともROM番号部105と書換開始アドレス部106を含む一部を解析し（ステップA4）、書換先の制御部に接続しているROMの書換開始命令を出力する（ステップA5）。

【0079】その後、書換先の制御部からの応答が出力されるのを待機し（ステップA6）、出力されたと判断した時点で、書換先の制御部へ書換開始アドレス部106を伝達すべく送出し（ステップA7）、続いて録音再生制御部20に対して第3ROM55に保持されている次のアドレスのデータ部102の送信命令を出力する（ステップA8）。

【0080】そして、この該送信命令に対応してデータ部102から送られてくるデータ部102の受信を待機し（ステップA9）、受信したと判断した時点で、その受信したデータ部102を書換先の制御部へ送信する（ステップA10）。

【0081】この送信に対応して書換先の制御部から受信完了の信号が送られてくるのを待機し（ステップA11）、送られてきたと判断した時点で、まだ転送すべきデータ部102があるか否か判断し（ステップA12）、あると判断した場合には再び上記ステップA8からの処理を繰返し実行することでデータ部102のすべてを書換先の制御部に転送する。

【0082】そして、上記ステップA12で転送すべきデータ部102がもうないと判断すると、書換先の制御部に対して転送終了の信号を送出し（ステップA13）、以上でこの統括制御部23による転送プログラムの実行を終了するものである。



【0083】一方、この統括制御部23からのデータを受信する書換先の制御部においては上記ステップA5で統括制御部23から受けたROM書換命令により図11に示すような転送受信プログラムを実行するようになるものである。

【0084】すなわち、書換先の制御部は、まず上記ROM書換命令に応答して統括制御部23に対し、この転送受信プログラムの起動を完了したことを示す信号を送出した後(ステップB1)、今度は録音再生制御部20から上記書換開始アドレス部106が送られてくるのを待機し(ステップB2)、これを受信したと判断した時点で(ステップB3)、その受信した書換開始アドレス部106の内容を書換先のROMの制御アドレスとしてセットする(ステップB4)。

【0085】その後、統括制御部23から該当するデータ部102が転送されてくるのを待機し(ステップB5)、これを受信したと判断した時点で(ステップB6)、その受信したデータ部102を一旦接続しているRAMに保持した上で、そのデータの内容が転送終了を示す信号ではないことを確認し(ステップB7)、それからRAMに保持したデータ部102を書換先のROMに書込設定する(ステップB8)。

【0086】次いで、統括制御部23に対して受信完了を示す信号を出力し(ステップB9)、ROMの書換アドレスを「+1」更新設定した後に(ステップB10)、再び上記ステップB5からの処理を繰返し実行することで、送られてくるデータ部102のすべてをROMに書込設定する。

【0087】そして、上記ステップB7で受信したデータが転送終了の信号であると判断すると、以上でこの制御部による転送受信プログラムの実行を終了するものである。

【0088】図12は第1ROM51の内容を書換える場合の、ダウンロードしたデータの経路を太線で区分表示するものである。同様に、図13は第2ROM53の内容を書換える場合の、ダウンロードしたデータの経路を太線で区分表示するものである。

【0089】また、図14は第4ROM57の内容を書換える場合の、ダウンロードしたデータの経路を太線で区分表示するもので、この場合、特に書換先のROMが第4ROM57であることから、転送プログラムを起動した統括制御部23自身が接続されている第4ROM57の内容を書換えることになるので、新たに転送受信プログラムを起動する必要はなくなる。

【0090】このように上記第3の実施の形態によれば、回路内の制御プログラムや音声データ等を記憶するためのメモリをすべて電気的に書換可能な不揮発性メモリで構成し、音声データを記憶するメモリを一時保持用とすることで、無線回線から任意の制御部用の新たな制御プログラムをダウンロードすることが可能となり、さ

らにダウンロード時に大容量のワークメモリ等を必要としないので、無用な回路素子を用いることで回路規模を増大し、且つ製品コストを上昇させてしまうことなく、気軽に回路内の各種動作に関する制御プログラムをダウンロードして更新し、生産者の作成した制御プログラムの不具合の修正や性能を向上させるためのバージョンアップが可能となる。

【0091】なお、上記第1乃至第3の実施の形態はいずれもPHS端末機に適用した場合について例示したものであるが、本発明はそれに限定されず、音声を録音し再生する機能を有する携帯通信端末機であれば、他にもデジタル/アナログ携帯電話、特定小電力トランシーバ等にも適用可能であることは勿論である。その他、本発明はその要旨を逸脱しない範囲内で種々変形して実施することが可能であるものとする。

【0092】

【発明の効果】請求項1記載の発明によれば、通信動作の制御プログラムを記憶するためのメモリと留守番録音用の音声データを記憶するためのメモリを共に電気的に書換可能な不揮発性メモリで構成し、そのメモリへのアクセスルートを切換えることで、無線回線から新たな制御プログラムをダウンロードすることが可能となり、さらにダウンロード時に大容量のワークメモリ等を必要としないので、無用な回路素子を用いることで回路規模を増大し、且つ製品コストを上昇させてしまうことなく、気軽に通信動作に関する制御プログラムをダウンロードして更新し、生産者の作成した制御プログラムの不具合の修正や性能を向上させるためのバージョンアップを行なうことが可能となる。

【0093】請求項2記載の発明によれば、1つの電気的に書換可能な不揮発性メモリで、通信動作の制御プログラムを記憶するためのメモリとデータを記憶するためのメモリを共用するものとして構成し、そのメモリ内のエリア位置を制御するようにしたので、複数のメモリを切換えるためのスイッチング素子を排除しながらも、無線回線から新たな制御プログラムをダウンロードすることが可能となり、さらにダウンロード時に他に大容量のワークメモリ等を必要としないので、より小さな回路規模で装置の小型化に寄与し、さらに製品コストを低減可能としつつ、気軽に通信動作に関する制御プログラムをダウンロードして更新し、生産者の作成した制御プログラムの不具合の修正や性能を向上させるためのバージョンアップが可能となる。

【0094】請求項3記載の発明によれば、回路内の制御プログラムや音声データ等を記憶するためのメモリをすべて電気的に書換可能な不揮発性メモリで構成し、音声データを記憶するメモリを一時保持用とすることで、無線回線から任意の制御部用の新たな制御プログラムをダウンロードすることが可能となり、さらにダウンロード時に大容量のワークメモリ等を必要としないので、無

用な回路素子を用いることで回路規模を増大し、且つ製品コストを上昇させてしまうことなく、気軽に回路内の各種動作に関する制御プログラムをダウンロードして更新し、生産者の作成した制御プログラムの不具合の修正や性能を向上させるためのバージョンアップが可能となる。

【図面の簡単な説明】

【図 1】本発明の第 1 の実施の形態に係る回路構成を示すブロック図。

【図 2】同実施の形態に係るメモリの切換接続の具体的な構成を例示するブロック図。

【図 3】同実施の形態に係るメモリの切換接続の具体的な構成を例示するブロック図。

【図 4】本発明の第 2 の実施の形態に係る回路構成を示すブロック図。

【図 5】同実施の形態に係る動作処理の内容を示すタイミングチャート

【図 6】図 4 のメモリのエリア構成を例示する図。

【図 7】同実施の形態に係る動作を説明するためのフローチャート。

【図 8】本発明の第 3 の実施の形態に係る回路構成を示すブロック図。

【図 9】同実施の形態に係るダウンロードされるデータの構成を示す図。

【図 10】同実施の形態に係る動作を説明するためのフローチャート。

【図 11】同実施の形態に係る動作を説明するためのフローチャート。

【図 12】同実施の形態に係るダウンロードしたデータの経路を例示する図。

【図 13】同実施の形態に係るダウンロードしたデータの経路を例示する図。

【図 14】同実施の形態に係るダウンロードしたデータ

の経路を例示する図。

【符号の説明】

10, 40, 50…PHS 端末機

11…アンテナ

12…受信部

13…送信部

14…PLL シンセサイザ

15…TDMA 部

16…音声処理部

17…スピーカ

18…マイクロフォン

19, 19'…通信制御部

20…録音再生制御部

21…第 1 メモリ

22…第 2 メモリ

23…統括制御部

31~34…マルチプレクサ

35…インバータ

41…メモリ

51…第 1 ROM

52…第 1 RAM

53…第 2 ROM

54…第 2 RAM

55…第 3 ROM

56…第 3 RAM

57…第 4 ROM

58…第 4 RAM

101…ヘッダ部

102…データ部

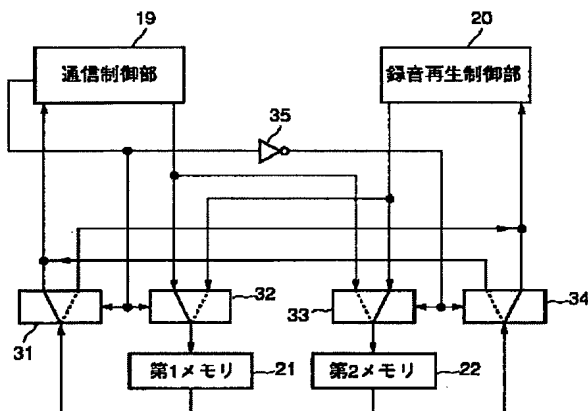
103…書換識別子

104…レンジス

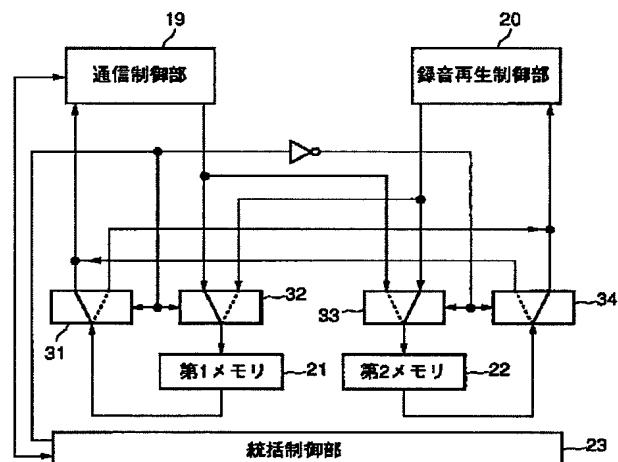
105…ROM 番号部

106…書換開始アドレス部

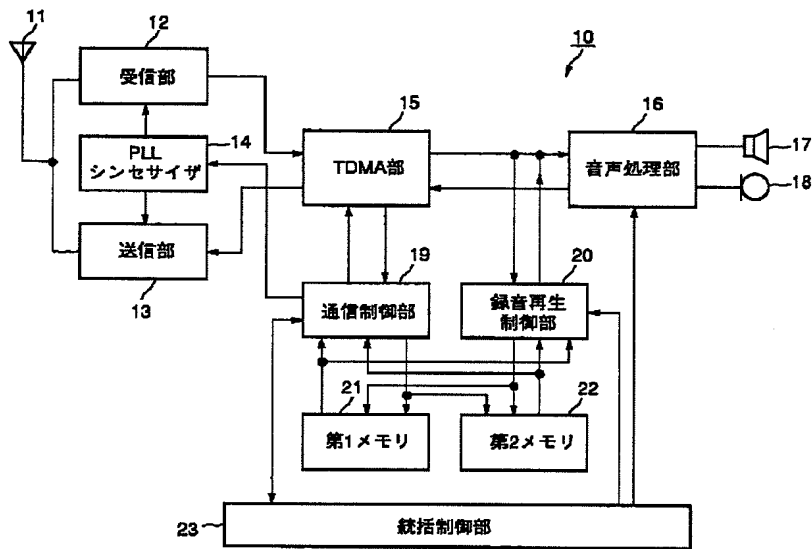
【図 2】



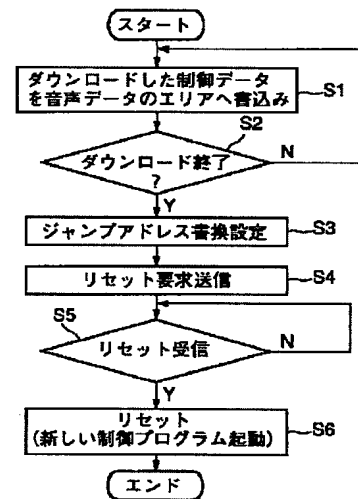
【図 3】



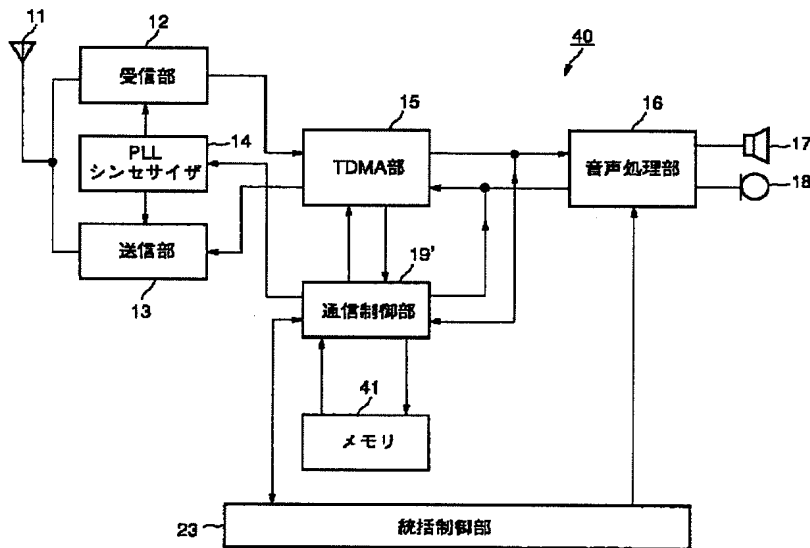
【図 1】



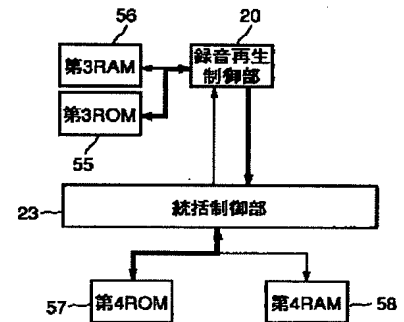
【図 7】



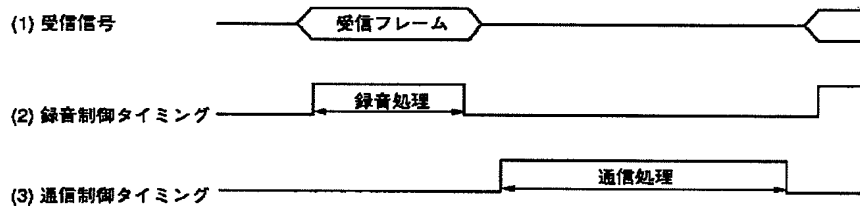
【図 4】



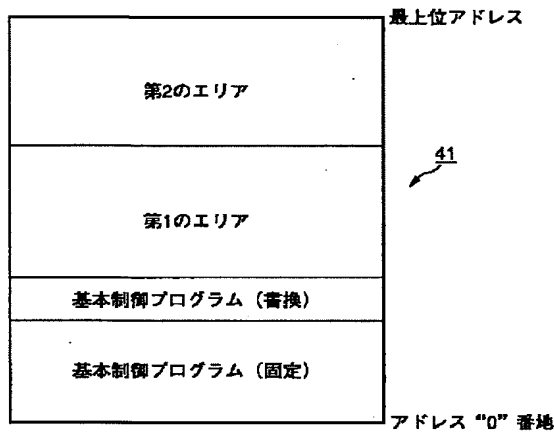
【図 14】



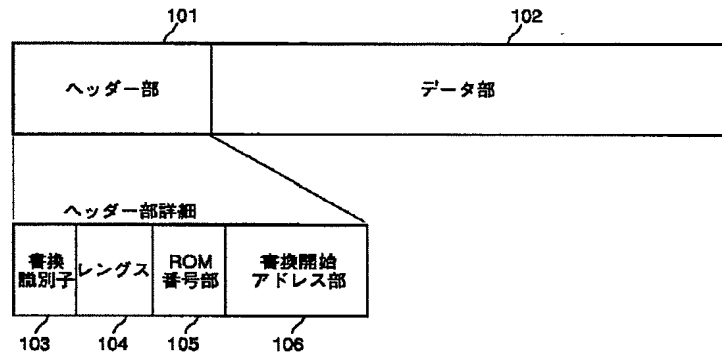
【図 5】



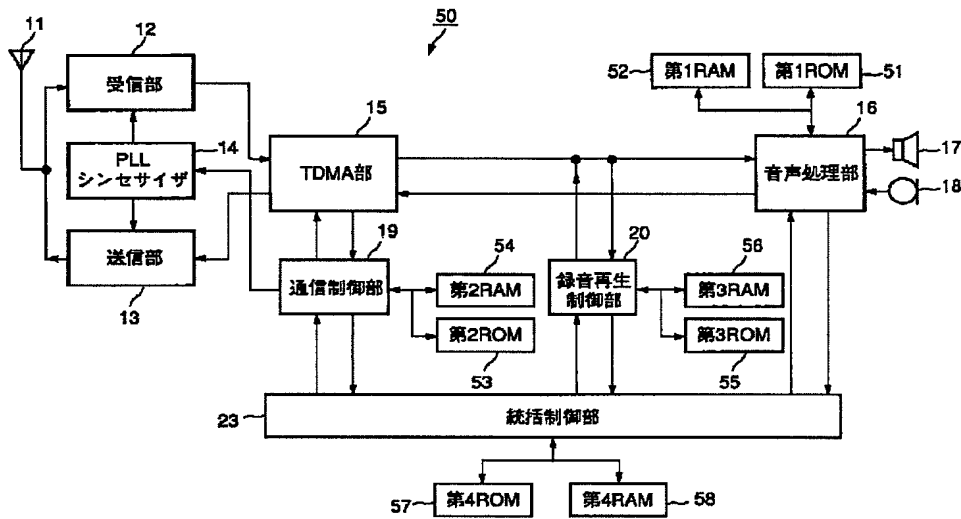
【図 6】



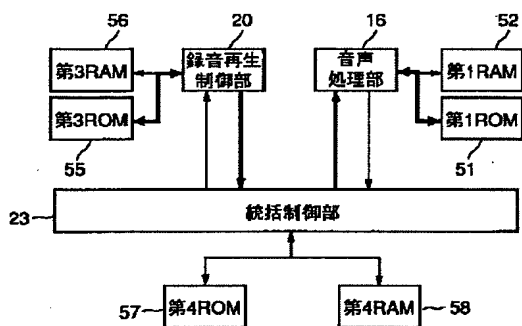
【図 9】



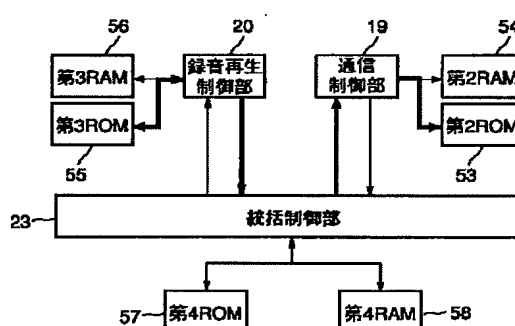
【図 8】



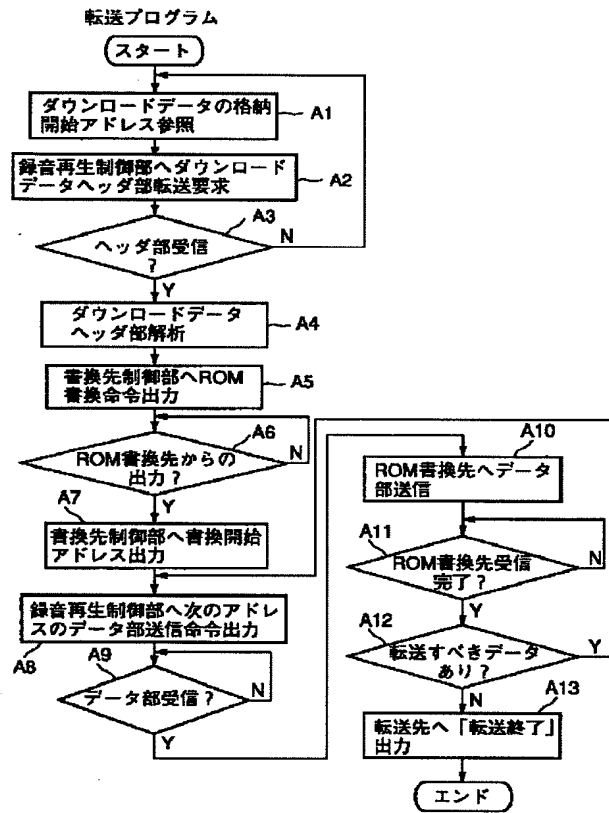
【図 12】



【図 13】



【図 10】



【図 11】

